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IN THIS ISSUE:

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The Economic and Social Status of The Engineer*

By C. G. Roush

President, Missouri Society of Professional Engineers

Editor's Note: We asked Mr. Roush to submit this address for publication in The American Engineer, in part because we feel this general subject is one to which Professional Engineers ought to give a great deal of more attention.

I welcome this opportunity to discuss the social and economic status of the Engineer. My particular part of this discussion is to explain briefly how the Engineer has fared in his efforts to promote his professional status and improve his recognition and economic position.

Our position in life is usually considered to be good, average, or bad, but always on a comparative basis, e.g., probably the lowest economic group in this country is quite high compared to the top group of some foreign countries. Likewise, the economic status of the Professional Engineer in this country may be compared to that of other professions requiring comparable education and training, and thus an analysis may be made to determine the causes or reasons for the comparative rating.

Three Professions Compared

I would like to sketch briefly the history and growth in the United States of the three professions of Medicine, Law, and Engineering.

MEDICINE: During the early years of our country, medical education was by means of apprenticeship to an established doctor for a number of years before individual practice was attempted.

In 1762 Dr. William Shipper, Jr. started a lecture course on Medicine in Philadelphia. This developed into the first Medical College in 1765, and by 1840 there were 26 schools. The number of colleges increased, until there were a total of 76 completely accredited colleges in 1930 in the country. This compares to 162 in 1906, but dropped due to higher standards of requirements of the Medical Profession.

C. G. Roush

Mr. Roush was born in West Virginia; graduated from Oklahoma University, in Electrical Engineering. Employed by Westinghouse Electric Corporation since 1923, at various plants in the East, and for the past 20 years, in and around Kansas City, Missouri. Manager of the Kansas City Branch of Westinghouse Electric Corporation, since January 1937. Past chairman of the Kansas City Sec., A.I.E.E., Past president of The Electric Association of Kansas City; Past president of the Exchange Club; Past President of the Western Chapter, MSPE, and now President of the Missouri Society of Professional Engineers.

The American Medical Association was organized in 1846. The stated objective of this Society is as follows:

> "To promote the art of science and medicine: The Association shall endeavor to *unite into one compact organization* the medical profession of the United States for the purpose of fostering the growth and the diffusion of medical knowledge * * * of safeguarding the material interests of the medical profession, *of elevating the standard of medical education, of securing the enactment and enforcement of just medical laws, of enlightening and directing public opinion in regard to the broad problems of hygiene,* and *of representing to the world the practical accomplishments of scientific medicine.*"

By 1930, all political divisions of the United States, except Alaska, had examining and licensing boards. These require for licensing:

(1) General, preliminary education requirements, and

(2) Professional preparation.

The requirements of all states are fairly uniform.

LAW: The formal law education in the United States started in 1793 by the appointment of James Kent to a Professorship of Law in Columbia University. Harvard Law School was established in 1817. By 1930 there were a total of 180 colleges conferring law degrees.

The American Bar Association was founded in Connecticut in 1878. The activities of the Association have been, in brief, to:

(1) Promote standards of legal education,

(2) Promote social legislation, and

(3) Secure uniformity in state statutes regulating matters of general concern, e.g., commercial paper, sales, warehousing, etc.

By 1930, thirty-five states required additional examinations before admission to the Bar.

Engineering's Slow Growth

ENGINEERING: The first United States Military School was founded in 1802, and approximately for thirty years was the only recognized agency for engineering education. In Troy, New York, between 1825 and 1835 was founded the first institution in the world for giving instruction in engineering of non-military nature. During the next thirty years only four more schools were founded. At the close of the Civil War there were less than three hundred engineering graduates in this country, exclusive of West Point. (During the Civil War 22,000 medical officers served.) It is generally conceded formal technical education was inaugurated in this country in 1885.

By 1930 there were slightly over 100 institutions giving complete engineering training in more than one branch.

Until about 1900, our country was chiefly engaged in subduing the great

* An address delivered recently before The Engineers' Club of St. Louis, Mo.

West, establishing homes, founding cities, and building railroads.

Until about this time, practicing engineers doubted or denied the value of a technical training for young engineers and distrusted the engineering graduate. Only in recent years engineering has ceased to be traditional, and has become scientific, and engineering has come to be recognized as a learned profession.

The Techincal Societies

The histories of the major national technical societies are as follows:

A.S.C.E. — Founded in 1850, and the objects were:

"Professional improvement of its members, the encouragement of social intercourse among men of practical science, the advancement of engineering in its several branches, and * * * the establishment of a central point of reference and union for its members."

American Chemical Society — Founded in 1876, and the object is:

"Advancement of chemistry and the promotion of chemical research." ....

A.S.M.E. — Founded in 1880, and the objects were for—

"The purpose of reading, discussing and publication of papers on engineering subjects and for the advancement of the profesion of engineering in any direction."

A.I.E.E. — Founded in 1884, and the objects were for—

"Advancement of theory and practice of Electrical Engineering and of the allied arts and sciences, the maintenance of a high professional standing among its members, and the development of the individual engineer."

I would like to cite one more Association, and then try to develop the meaning of this comparison:

The Labor Movement

The *American Federation of Labor* was founded in 1881, and some of the objects were:

"Encouragement and formation of local trade and labor unions * * * to secure legislation in the interest of the working masses. To influence public opinion * * * in favor of organized labor; * * * to aid and encourage the labor press."

Briefly summarized, this history indicates:

(1) Formal, technical education for the Engineering Profession is much younger in this country than that of Medicine and Law. In fact, for other than Military, formal technical engineering education for the world is less than 100 years old and was started in this country.

(2) The Professions of Medicine and Law early established National organizations and the objectives were:

(a) To seek proper legislation and educate and influence the public in their favor; and

(b) To promote better education in their respective fields and establish a certain degree of uniformity in professional requirements throughout the country.

These professions early established by law the definition of their profession and by these same laws precluded the practice of the profession, regardless of the educational background, until compliance with the requirements of the law were met.

All of this was set up and placed in operation notwithstanding the members of these two professions deal mostly with the individual citizen and thus influence their thinking directly as to the importance and definitions of their respective professions.

Compare With Engineering

(3) Compare this to the Engineering Profession. As yet, there is no organization of all engineers at the national level. The various national Founder Societies have done much good, but their primary stated objectives are mostly for the interchange of scientific information among their members, and not to inform the Public.

Consider the fact the Engineer deals mostly with things, and the Public recognizes only the results achieved and not the science, research and knowledge necessary to produce this result.

Most states now have Registration and Licensing Laws, but only in a few states are these laws compulsory for the practice of engineering of any and all types.

Briefly stated, when a layman has contact with the Law or Medical Profession, it is usually with an individual of the Profession; yet when a labor saving device in the home, modern transportation, radio, or any other equipment designed and built by the engineer, is used, there is no thought, by the layman, of the engineer who made this possible. In other words, no personalized picture or contact is present to help tell the engineer's story.

The Profession Must Be Clearly Identified

I believe no one present will question the tremendous advancement of knowledge, skill and achievement of the engineer during the past few years. Apparently then the question is not how to gain further technical advancement, as this will come, but rather how to define a true Engineer and how to make the public conscious of what the Engineer has accomplished, enlighten them on how to distinguish between the truly professional engineer and the many others who use the term "Engineer" loosely. I believe when this is accomplished the true Engineer will take his correct place among the men of learning and to a great extent the economic status of the Engineer on a high plane will have been established.

The final question then is where are we today, and what are we doing to accomplish this purpose?

(1) I believe all of the Founder Societies are awake to the need for an organization of all Engineers at the National level, and much study is being devoted to this problem.

(2) Forty-seven of the forty-eight states have some kind of Registration and Licensing Law. These are far from uniform and, unfortunately, most of these laws do not make registration compulsory for the practice of Engineering. Ultimately, when this is done, the definition of an Engineer will be as given by Mr. E. A. Holbrook, Dean of School of Engineering and Mines, University of Pittsburgh: "An engineer is a man who has been legally qualified to practice the profession by the laws of his state."

Educate The Public

The public must then be informed of the true meaning of the term "Engineer," so that those individuals not authorized to practice will not be considered as Engineers.

(3) The States of New York, Ohio and Pennsylvania have their laws worded to include the young graduate as an "Engineer-in-Training." Other states, such as Georgia, Minnesota, Iowa and Missouri are following this practice. This permits the graduate to take his technical examination for registration immediately when leaving school. Later, after a proper experience record, he may be licensed without further examination.

(4) Legislation at the National and State levels must be watched closely and guided into the proper channels for the Engineer. After all, gentlemen, we live by and within the law, and it is essential these laws are favorable, or at least not unfavorable.

(5) We hear much discussion of unionization of the Engineer. Many young Engineers are practically forced to join labor unions and perhaps temporarily receive greater compensation for so doing.

These men immediately lose their individual rights for free thinking and advancement by ability, instead

of by seniority. At the present, there is no clear-cut decision of the Labor Relations Board that would definitely exclude the "Engineer-in-Training" or professional engineer from being required under some circumstances to join a union.

This law, however, does not include the lawyer and the doctor, and we feel confident as engineering is defined properly and established as a profession, its members will be excluded. It is, therefore, essential that all engineers support their Registration and Licensing Laws by registering and educating the public of these laws.

Personally, I feel when the unions fully realize the Engineer has been trained for free, analytical thinking and action, he will not be a welcome member. It is, therefore, essential to keep the standards of engineering education at a high level and for our educators to take the lead in professionalism by meeting all of the requirements in their respective states and pass this knowledge on to their students.

* * * *

I appear before you tonight as President of the Missouri Society of Professional Engineers, an affiliate with the National Society of Professional Engineers. Much difference of opinion exists among engineers as to the proper over-all organization at the National level. I cannot state definitely the present professional organization is the answer, but believe it is a step in the right direction.

Offered for your consideration is the objective of the National Society and the Missouri State Society, as stated in their respective Constitutions.

The National Objectives

"The advancement of the public welfare and the promotion of the professional, social, and economic interests of the Professional Engineer."

The State objective:—

"Creation and enforcement of adequate and proper License Laws and Practice Acts * * * to sponsor and promote honorable procedure tending toward recognition and responsibility of the profession, and to focus public attention upon the functions, requirements and accomplishments of engineers; to further the advancement of the profession of engineering in its several branches, the professional improvement of its members, the promotion of the professional welfare of its members * * * and the sponsoring of proper and adequate legislation for the protection of engineers and of the public against irresponsible and unethical practices."

With your permission, I would like to enumerate a few of the important accomplishments, in the State of Missouri, of this Society since its birth ten years ago:

(1) An organization of approximately 1200 engineers of Professional standing or qualifications in the State Society and 9 active operating chapters.

(2) Securing passage of a Registration and Licensing Law in Missouri. There are now slightly more than 2200 registered Professional Engineers in Missouri.

(3) Publication of the Missouri Engineer, a monthly magazine devoted to telling the Engineers' story to members of their own profession, to management of private industry employing engineers, and to municipal, county and state governing bodies throughout the state. We hope to increase the circulation to cover all important contacts in the state. Today the circulation is approximately 3,000.

(4) A Legislative Committee watches and studies legislative matters injurious to the engineer and works to prevent their passage or to alter them to be less harmful. This committee is also on the watch to foster proper legislation.

(5) A committee has studied the problems of collective bargaining and made certain recommendations to counteract this movement to the detriment of the engineer.

(6) A program for the "Engineer-in-Training" has been inaugurated to assist and guide the young graduate. This committee has as Chairman in 1946 your own Professor John W. Hubler of Washington University.

Salaries and Fees

(7) A committee has completed the study of "A Schedule of Minimum Salaries And Fees For Engineers" in the state. This will be published in an early edition of the Missouri Engineer as a committee report. Briefly, this schedule attempts to cover the following:

(a) Show the engineer what to expect if he progresses.

(b) Guide for business and employers of engineers.

(c) Guide to public of what to expect from engineers.

This schedule is prepared as follows:

(a) General outline only, adaptable to all businesses and governmental bodies.

(b) Education and experience qualifications. Higher grades stress extra leadership.

(c) Work performed.

(d) Compensation.

(8) A strong Code of Ethics and Practice has been recommended by the Society to govern the activities of the Professional Engineer.

* * * *

These are only a few of the accomplishments and the Society is continuing to study and trying to place in effect ways and means of improving the economic and social standing of the Engineer in the Community.

Sources of Wealth and The Engineers' Part

In general, there are three fundamental sources of wealth for any nation or people:

(a) Agricultural and live stock.

(b) Mineral.

(c) Manufactured products.

The Engineer has been primarily responsible for developments to exploit properly the first two, and almost wholly responsible for the development of the third.

Engineers made it possible for our Nation to be on the winning side of World War II, as this was definitely a war of science and material.

While the Public is slightly conscious of this fact, let us strengthen our laws, encourage all qualified engineers to support them, raise our standards of education and practices, and establish true professionalism, in the public eye, for the Engineer.

The Lost Generation

"The Lost Generation of Engineers," is the title of a very interesting lead article which appeared in the Hudson Engineering Journal. It was written by William B. Plank, head of the Department of Mining and Metallurgical Engineering, Lafayette College, Easton, Penna. One of our readers writes to suggest that an equally appropriate article might be written for the American Engineer entitled: "The Lost Generation (Period)."

At a forum of foreign newspaper correspondents it was agreed that American GI's with an average educational level much higher than that of most soldiers from other lands, are nevertheless politically the least informed. An educator's comment is: "Too much political control of education."

The Future Role of the Engineer

*An Address by W. Homer Turner**

Before the Westchester Chapter of the New York State Society of Professional Engineers

Your officers have asked me to address you on THE FUTURE ROLE OF THE ENGINEER. To be completely frank about it, they know as well as you do that the function of the engineer will be the same tomorrow as it is today and that is constructing, managing, arranging and contriving with respect to the realization of mankind's hopes and dreams. Such activity has been always the province of the engineer and will remain ever so.

To complicate the task they have asked your speaker to attempt what no man since Diderot has been able to do — to make useful observations concerning immediate and distant future conditions as well as observations about technological and sociological factors. If only nature were involved, and not man also, one might emulate the brief style of the Book of Genesis as to the creation of the world. But human beings — and engineers are occasionally included in that classification — working with natural forces and natural resources, of necessity, give cause for expanded treatment.

Engineers Preoccupied

Also in a spirit of frankness, it is reasonable to note that the engineer in his technical milieu is pre-occupied with design, efficiency, and the like, and he is unmindful sometimes that such things are intimately related to government, politics and the whole field of public institutional developments. Of late, however, the engineer's recollection of the close kinship of the two areas has been refreshed of those goods and services which he, by the strange and continuing absence with his great and accumulated talents, helped to create and reasonably expected to enjoy.

Current painful reminders, therefore, serve my purpose of relating the technological and sociological roles of the engineer. My method of relating these roles will be to appear to review the two separately so that you may judge for yourself whether such a separation is possible and, if separable, the consequences of a professional existence in which the artificer knows not what he has wrought.

* (Any views expressed herein are those of the speaker and do not reflect any opinions of any organization or individuals with whom he has been or is associated — either in a professional or an employer capacity.)

W. Homer Turner

About the Author: William Homer Turner is an engineer, attorney, executive and author. A native of Georgia, he now resides in New York, engaged as a statistician for a large Steel Corporation. His activities cover a wide field. In addition to engineering, he has practiced law, has written numerous articles on economics, industry and applied science. He is a member of the N. Y. State Society of Professional Engineers, and the N. Y. State Bar, and has served in the armed forces.

The Technological Role of the Engineer

Before detailing the technological role of the engineer one must frame that role in relation to the scene which contemporary daily life presents. If anyone could stand before you now and authoritatively answer the urgent professional questions affecting your 1946 activities as to what you will have to work with, what it will cost, what contractual relations you should enter, what taxes you will pay and (more importantly) in what form, also what interference will be imposed upon you by those assuming prevision of outlook — then part of the present post-war "jitters" might be dissipated permitting the luxury of the milder war-time "nerves." Your speaker makes no claim to such omnipotent omniscence.

Yet perhaps together in common counsel may be found some benchmark or base to form a beginning for the construction of a useful mode of future professional life. If such can be done then some of the urgent questions may be settled for more than a single day.

1919-22 Pattern Being Repeated

So with no desire to engage in prophecy respecting the precise movement of our crude statistical indicators, near-term observation is limited to the conclusion that the *physical* phase of re-conversion from war to peace almost has been completed. The pattern of the aftermath of World War I — to the extent that the 1919-1922 experience is to be repeated — is approximately drawn. After V-J Day the Federal Reserve Board Index of Industrial Activity turned upward and stood recently at about 170, compared with a World War II peak of about 240. Disturbances of one kind or another may have delayed complete re-conversion for a few months. The physical re-conversion to date has been achieved in the midst of such developments as the elimination of lend-lease shipments, contract terminations, disposal of war-time facilities, disturbed trading conditions in raw materials, and partial demobilization of government and military personnel.

Alongside of this progress in physical re-conversion we see, on the other hand, that the fundamental re-conversion from a controlled to a so-called free-market economy hardly has begun. The primary controls over prices, wages and other elements of costs, the powers to adjust money values and public credit — powers employed with almost every shifting wind of political whim — remain to rob our peacetime voluntary exchange system of the vital element of flexibility. Added to the list of domestic controls are those international policies affecting the making of grants to other nations, properly in aid of a war-ravaged world, but under *terms* which can retard production.

It appears, therefore, of little moment to make a detailed review of this or that industry in 1946 or 1947. The situation in the building construction industry may be cited in support of such a position. In that industry, in the presence of an unparalleled demand for its goods and services, the conditions for doing business involving the full use of the engineer's talents are conditioned not on what he may

choose to do, in the interest of his own and general progress, but upon what he will be *permitted* to do.

Page the Law of Supply and Demand

Indeed, such factors as income, need of homes, population shifts, transportation and communication changes, availability of public utility services, do not freely influence the need for the engineer's services in relation to any known version of the law of supply and demand. The use of engineering services is increasingly controlled by such factors as taxes, public debt and the state of governmental budgets, laws for ceilings, minimums, allotments, and the like, resulting in restrictive practices affecting operating economies.

Not alone in construction but in the whole group of industries with which the engineering profession so closely is identified—durable goods—similar influences are to be noted. For example, the normal reasons for purchasing new durable goods are to meet technological obsolescence, the desire for better goods and the need for expansion of production. Without making any allowance for current issues affecting costs, what is happening in America is reflected by the fact that some experts believe that depreciation provisions 70 per cent above pre-war rates for the replacements of heavy equipment are necessary. The consequence of this degree of cost increase in a short space of time upon the market for the services of the engineer is bound to be profound.

Reconversion Stalemate

Enough has been indicated to show the futility of attempting to forecast any totals of engineering activity by common classifications when the reconversion from a controlled to a voluntary system is at a standstill. But it is by no means futile to forecast later the functions of the engineer. Historically it has been the merit of the engineer to know the wants of man, to possess scientific knowledge about these wants of man and finally to have the "know-how" for satisfying such wants. Tomorrow's engineer must, in addition, possess an ever greater degree of expertness as to customer service as well as vastly increased knowledge about product quality and variety.

It is in the field of customer service that the engineer acts as the catalyst for his technological contriving. Tomorrow's engineer must be more than merely generally informed as to the policies, organization, methods, facilities and personnel of his customers or clients. (When you willingly or unwillingly hear the radio commercial of a cigarette manufacturer, "LS - MFT" "LS - MFT", you might usefully memorize the paraphrase, "PO - MFP", "PO - MFP", so as to think more frequently of these five factors of policies, organization, methods, facilities and personnel — actors controlling the conduct of all enterprise and without masterful consideration of which no great engineering applications are made.)

The Alternatives

"The alternates to some intelligent study of the available material and human resources, are cults of insurrectionary violence which will inevitably breed a successful and ruthless reaction, or an acquiescent opposition, content to gather only crumbs from life's great potential.

"You (Engineers) who are trained to action must take up the task, for the process of selection of leadership in constitutional democracies generally has operated . . . to recruit the nation's statesmen from those who can talk glibly, write elegantly and argue forcibly, without the capacity to act competently. And unless this can be changed, democracy may be finished."

It is in the field of product quality and variety that the basic technological contribution of the future engineer is to be made to society. The entire economy of the world is affected by this form of engineering expertness. The trends of today are, therefore, quite significant both as to transition and the distant future.

Methods of product development for peacetime and wartime requirements are fundamentally the same. In the transition from one category to the other, the change is largely one of emphasis to develop a selected set of properties most appropriate to the intended use — whatever that use may be. It is the task of the engineer to know the effects of chemical, mechanical and other influences upon the basic products he uses or recommends for use by customer or client to the end of lowest cost, desired properties and performance.

New Products Emerging

Recently there has been much discussion about the displacement of basic, long familiar products by new and competing products. For example, many statements have been made regarding the potential applications of aluminum, magnesium, their alloys, plywood, glass and plastics in fields in which such primary products as steel and heavy lumber have enjoyed in the past a dominant market position.

Unquestionably appreciable displacements will occur but the speed and volume of the shifts which may be expected should be related to many factors such as public education, the present state of the respective sciences involved, attitudes of workers and the respective properties of the materials in competition.

All of the tonnages of newer basic products taken together produce a combined total which is but a small fraction — nationally considered — of the eighty to ninety million tons of available steel.

Alloys of aluminum of strength approximately that of ordinary structural steel are easily produced but are not cheap at prices around 30 cents per pound — even allowing for the weight advantage. The long-term average price of steel is about 3 cents per pound. Where deflection is important in beams and columns, full advantage of the weight ratio in favor of aluminum is not realizable because the modulus of elasticity of steel is approximately three times that of aluminum. Similar considerations operate with respect to the use of aluminum in heavy transportation construction but in the field of light transportation fabrication additional aluminum applications may be expected. If, for instance, stiffness is wanted without increase in weight the lower specific gravity of aluminum may commend its use — stiffness being a function of thickness.

Where high temperatures are encountered the strength of aluminum and magnesium make these materials inappropriate. Compared with room temperature properties, the yield strength for aluminum alloys at say 400° F is plus or minus 40 per cent but at 600° F drops to plus or minus 8 percent. With magnesium, compared with room temperature properties, yield strength at 400° F is plus or minus 30 per cent but at 600° F drops to plus or minus 16 per cent. In contrast, it is noted that there is

little change in strength of ordinary steels up to say 750° F and certain types of steels have much higher temperature limits, ranging up to 1000° F before their strengths decrease materially.

Plastics Developing Rapidly

The development and utilization of plastics have conferred many benefits on all segments of the public. Their remarkable properties and flexibility of application in industry impinge, however, largely upon the markets of non-ferrous metals, alloys, wood, glass. In large sections plastics are relatively expensive, and, for many purposes, are deficient. Their organic composition is a limitation also upon the range of temperature over which they may be used. The prospect seems to be in increasing use, jointly, of plastics and other older basic materials.

The position of wood, in view of the many progressive developments with that product in recent years, is highly interesting. With certain new adhesives and impregnations with special synthetic resins, wood can be made highly resistant to swelling and shrinking with — as well — its mechanical properties improved. Types of plywood may be formed and shaped in operations somewhat like those used in the fabrication of non-ferrous and ferrous products but not yet with equal facility.

Developments in Steel

These trends, while suggesting that the development of new basic products in recent years and the improvement of older products will bring notable changes, do not show that revolutionary changes are marching doubletime through the threshold of the engineer's office. Accordingly, we may note a few facts affecting development of steel products which, it appears, will continue to be the fundamental basic material for engineering use.

With the partial passing of the wartime Natnoial Emergency steels a notable return to pre-war conditions — when availability of an extreme variety of types of steels was typical — is expected by many. The wide range of products offered in the past is shown not only by the varying processes by which steels are made, but more significantly by the various chemical compositions and treatments which provided properties to meet the needs of innumerable kinds of service.

In relating the range of products available to the technological role of the engineer the salient point is that product development and variety had to await the inter-action of several factors. One such factor was the origination and growth of numerous industries which called for increasing quantities and kinds of products to perform services formerly unwanted or unknown.

The rail with its toughness, strength, hardness, ability to withstand wear and heavy impact would have had no market in the early days. Steel and railroading grew and kept in step as new requirements became evident. Again there was a time when special varieties of steel were not made for armatures, rotors, transformers, and the like, but with the rise of electric power and the need for special materials in the construction of its pertinent equipment, new types of steel were developed. Atomic power, at the current stage of U235 development, also has a connection with the evolution of product variety but that subject is beyond the bounds of present review.

Major Current Problems

"The major current problems affecting the future of the engineering profession are (1) *the scope and form of engineering education and,* (2) *pending Federal legislation respecting science and research. These two problems are inextricably interwoven as to many future technological and sociological developments. The choice of the best policies and programs respecting engineering education and science legislation should be the chief concern of those today carrying the training future engineers and in shaping the legal relation of engineering and society."*

Specialized Products in Demand

As another illustration of the operative principle, it is beyond doubt that the automobile industry has inspired the development of many highly specialized flat-rolled products of low carbon steel. Too, the builders of agricultural machinery and farm equipment have exerted an influence similar to that of the automotive industry and, likewise, the petroleum industry has necessitated ever-changing products. The chemical industry often conducting operations at high temperatures, as well as the modern steam plant using superheaters, create and extend the field of high-temperature steels on land and sea. Now that gas turbines are being used to operate superchargers on airplanes and jet propulsion has become a reality, there is increased need for more highly specialized products to meet the difficult engineering conditions imposed.*

Production of specialized products would have been much more difficult had not companion industries devoted their attention to the furnishing of requisite quantities of many alloying elements. Indeed, all product advance was made possible by the genesis and growth of industries induced by the growth in the several branches of applied science. Thus the central point to note is that useful development of one basic product was nurtured by the collateral development and expansion of numerous manufacturing and consuming industries.

Better Industrial Equipment

A second factor contributing heavily to the advancement of basic industries is the development of progressively better equipment with which to conduct each industrial operation. Groups of related mechanical and chemical industries, catering to the needs of some other industry, have grown up and flourished. For example, refractories, electrical devices, improvements in flame and electric arc welding, are among a great host which have contributed to the general advance. Accomplishments in one industry lead to multiple accomplishments in another, resulting in an ascending spiral of technological progress. In this pattern of events is the technological role of the engineer as it is played out on the stage of real life. It is a proud role. And one needs hardly add that social institutions and forms which hamper such development hamper general progress.

A third factor having a continuing influence upon both progress and the availability of products for engineering use is the progressively closer association of scientific research with industry. Increase in scope and acceleration in pace of scientific study, applied to industry by engineers, created a demand for more such assistance. Metallography is an illustration of this evolution for it has become an indispensible standby of the technologist. Again, the liabilities side of the balance sheet of war is heavily laden, yet on the asset side are some

* Refer to the 1945 address of Rufus E. Zimmerman, before the Newcomen Society, for many other illustrations of this operative principle.

items of wartime research contributing to progress as are shown by improved alloy and carbon steels.

Research in combination with the growth of consuming industries which created demands and provided outlets for a diversified list of products, and the development of improved equipment with which to apply new knowledge as it became available, working together in peacetime rendered a signal service for civilization during World War II. That same combination can still be operative, in fact, is waiting to proceed subject to but one condition—the presence of a social framework under which mankind may live and progress.

And so we come to the sociological role of the engineer — a part which must be played exceedingly well if the technological role is to be played at all.

The Sociological Role of the Engineer

The cardinal lesson is that all achieved in science and industry has been accomplished within the boundaries of political institutions and a legal system constructed upon time-tested concepts of liberty, respect for contract and limited government—all embodied within the original Constitution of the United States. As one may discover the principles involved in technological development by relating contemporary and historic problems, so in sociological development may be discovered principles operative by association of the present with the past.

The immediate legal problems affecting the application of the engineer's efforts thus in reality include much more than the instant questions arising from disposition of wartime facilities; price and material controls; the array of matters derived from widespread "regulation," r a p i d l y changing commercial relationships, movements affecting industrial and public relations of enterprise, aspects of taxation affecting the right to buy, sell, transport and do business generally, restrictions on patents, measures safeguarding the quality and identity of products; and, above all, attempts to superimpose theoretical methods of production and distribution by means of Laws never intended to accomplish such purposes.

In recent years, many have come to believe that a contract is nothing more than a convenient device to be abandoned as expediency dictates. Certainly contracts are increasingly interfered with by the paramount power of government to achieve some so-called social gain or to avoid a crisis by attempting the adoption of some expedient. For example, there is no reasoned basis for the adoption by governmental bodies of criteria which provide, on the one hand, for increasing costs but do not also provide or permit ways of absorbing such costs. All such efforts come to a focus at one point — the earning power and incentive element.

Michigan Engineers Join NSPE

Engineers Packed the Hall to Witness Presentation of Michigan's NSPE Charter

The Michigan Society of Professional Engineers became a part of the National Society on May 10th. Engineer Alex Van Praag, Jr., one of the vice presidents of NSPE, made the presentation of the Charter on that date at a special meeting in Detroit. Two hundred registered professional engineers accepted the invitation of the State Society to witness the ceremony.

C. George Krueger, Deputy Commissioner of the Department of Labor for the State of New Jersey and Director of the Division of Engineering and Safety for that State was scheduled to make the presentation but was grounded at Toledo, Ohio. He contacted the meeting over the telephone through Stephen G. Szabo, temporary president of the Michigan Chapter, and although not present extended his greetings and best wishes to the new state society.

S. G. Szabo is the first past president of the New Jersey Society of Professional Engineers. Their familiarity with the state and national organizations has been of great assistance in the formation of the Michigan group.

After the opening of the meeting and the Address of Welcome, Mr. Szabo accepted the charter for the Michigan Society. Following this Mr. Van Praag stated the objects of the National and State societies. He stated that the aims of the organization are the economic, political, educational and social advancement of the registered engineer with the maintaining of a sound Code of Ethics. When asked, "Is this organization a union?" Mr. Van Praag stated "No, and it can never be, but, it is not opposed to unions or any other organization."

Lawrence E. Peterson of Milwaukee, chairman of the membership committee for the Western Area of NSPE, outlined the history of the National Society.

Donald E. Trefry reported that the constitution and by-laws would probably be presented at the next meeting. Ralph Newhall spoke of the very rapid growth of the local group since it was organized in February of this year.

A. V. Sheridan Gets Citation for Splendid Work on American Engineer

In Appreciation

Whereas, Engineer Arthur V. Sheridan has for ten and one-half years voluntarily donated his editorial services, often at considerable personal sacrifice, as Editor (1935-36 and 1942-May, 1945), and as Associate Editor (1937-41, inclusive) of the "American Engineer", the official publication of the National Society of Professional Engineers, and

Whereas, the competent editorial and administrative services of Editor Sheridan materially aided the young Society in formulating its publication policies and in crystallizing engineer opinion, and

Whereas, the patient and unremitting efforts of Engineer Sheridan have effectively piloted the "American Engineer" through unchartered and often turbulent seas into relatively calmer waters; therefore

Be It Resolved, that the Officers and Board of Directors of the National Society of Professional Engineers do hereby gratefully acknowledge the Society's indebtedness to Engineer Sheridan and respectfully extend to him their sincere thanks; and

Be It Further Resolved, that this resolution, suitably prepared and signed, be presented to Engineer Sheridan and copies of it be spread upon the permanent records of the Society and published in the "American Engineer."

Unanimously Adopted at Meeting of Board of Directors of N.S.P.E., Deshler-Wallick Hotel, Columbus, Ohio, March 30, 1946.

Ritchie Lawrie Jr.
PRESIDENT

Russell B. Allen
ACTING EXECUTIVE SECRETARY

Above is a reproduction of the Citation presented to Mr. Arthur V. Sheridan on behalf of the National Society of Professional Engineers, at the Annual Meeting of the New York State Society on May 10th. The presentation was made by President Ritchie Lawrie, Jr.

This action is the result of a resolution passed at the Directors meeting in Cleveland, March 29th, and later approved by the Executive Committee.

The Human Equation

The subject of "regulation" always has been familiar to the engineer. The regulation of the speed of the modern steam turbine, as an instance, is so nearly perfect that electric clocks, which run in synchronism with the electric cycles turned out by modern electric systems, remain accurate to the second after years of continuous operation. And there are a multitude of other engineer-made Robots which regulate machines with near perfection. Some of these Robots let in more "steam" when the machine tends to slow down and less "steam" when it tends to speed up. But regulation of a quantity of "steam" is one thing and regulation of "human society" is quite another and in the difference lies the turning point for more or for less general progress.

Note carefully that technological utilization of "regulation" is based upon *laws of physical science* and not upon *laws of society*. Men will understand when and what to do if the second law of thermodynamics is repealed; men will *not* be so prescient upon the attempted repeal of an elemental social law.

This is true primarily because all are still in swaddling clothes as to the development of *science of human nature*. Progress toward the development of such a science is impeded by the unwillingness of many in authority or in positions of leadership to submit a social law to the same acid test which is applied to a law of science. This is eminently true with respect to many of the economic astrologies of today.

A truly scientific law is a recipe for doing something and its final validification rests in the domain of action. The confidence which scientific laws command depends upon large-scale opportunities for testing their capacity to bear fruit in the commonplace activities of everyday life.

What Price Bad Faith?

In the sociological area, as a by-product of attempted regulation of the individual, new social laws are being offered without the slightest intention that they will be tested in the manner by which scientific laws are validated. Bad faith in this particular is the grossest of all immoralities and is fraught with the greatest of hazards for general progress.

To the extent that America has an elemental social system which is founded on a science of human nature, that system is reflected in the Constitution of the United States. Leaving aside technically important legal qualifications, the American constitutional system is being subjected to violent modification. It may yet become, as a result of such modification, the supreme modern example of positivism even though the symbols of its original conception be retained.

A central issue reflected in the current struggle over change is that constitutional control over government itself inevitably has been weakened by government's adjustment to modern industrial problems to the

point where there results the dangerous position of having to protect individuals through statutes — statutes being laws which may be changed at will by any temporary majority seizing control of government — instead of by the Constitution itself.

As affecting the foundations of American constitutionalism which are freedom of the individual, a system of checks and balances including separation of legislative, judicial and executive powers, a wholly independent judiciary and the right of judicial review, the crisis is reflected in many variants of fears. These expressed fears include the need for protection against government, the almost uncontrolled rise of administrative law, the drift away from responsibility of and to the people, the atrophy of state and local government, the rise of almost unlimited national power, the loss of protection of minorities, the rise of cynicism, the influx of new legal and economic notions of a transitory nature, and the menace of materialistic theories of government.

"Legal Realism"

The change in our constitutional forms comes at a time of moral crisis for democracy everywhere. When the capitalistic system appeared to falter — in the expansion of production and employment — confidence in Locke's theory of natural rights was shaken. As apparently conditions had changed with the assumed modified pace of capitalism, attempts were made to modify "law" in relation to such altered conditions. Thus arose a cult of so-called "legal realism" which certainly cracked and, some believe, shattered constitutional foundations while blithely taking the continuance of democracy for granted. Over-emphasis on the desirability of legal realism, often called "order and security," led to the rise elsewhere — on a strictly "realistic" constitutional basis—of men like Hitler.

Challenged by the alleged ever-increasing tension between political democracy and capitalism, many of the legal realists have devoted their energies not to efforts at improving the basic constitution law, but to the task of entirely re-building democracy in accordance with what they conceive to be new social needs. Locke's idea of a neutral state, which was the foundation of the constitutional concept of the American government, was abandoned in favor of the concept of the Benthamites — a concept in which social reform goes to the end that there shall be the greatest good for the greatest number — taken collectively but not individually.

The activities of these so-called legal realists, and of others, have led to the impasse created by the pessimism of those who think things are so bad nothing can save man except violent change and those who regard the balance of economic and social life as so precarious that no experiments must be risked.

Scientific Method Demanded

The solution to the problem created is that man must — with patience — push the rationality of scientific method further and further into areas of individual and social life. The advances already made toward a *science of human nature* entitle all to be more hopeful of the future. The psychoanalytical clinical findings of Freud, for example, have enormously deepened man's understanding of himself and his anxieties as well as the aggressiveness and ambivalence of human nature. For the engineer, the study of human behavior, singly and in groups, in relation to technological and scientific developments with which he may be at any given time associated, is one of the great future professional tasks.

Of immediate significance two points respecting the psychological part of current problems deserve mention here. These are the devices of "idea association" and "word-selection." The techniques are easily illustrated. When a regime wishes to popularize some new project, the regime identifies the project with something universally established as having great merit. The actual value or practicality of the project is unimportant. Thus, the recently publicized world-wide "economic bill of rights" brings to psychological focus the sacrosanct character of the original bill of rights amending the Constitution of the United States. If the regime meets opposition to the project, it quickly identifies those in opposition with some symbolism which is in disrepute. So a man may be designated as an "isolationist" merely because he disagrees with the touted consequences of some proposed policy.

Slogan-Conscious America

As to the techniques of effecting changes in the basic constitutional structure by "word-selection" it must be recalled that there are only a limited number of national symbols which are readily disgested by the public as a whole. Therefore, words themselves become of prime importance. A history of the degradation of the constitutional order might well be written around the hue-and-cry of slogans — as distinguished from facts and principles involved. Such conditions make possible the uninterrupted vista which is the American psychological scene today. It is a scene of national egocentricity, emotional unbalance, and demand for security.

National egocentricity, exhibited in excessive absorption with individual and group selfish interests, threatens to bring an end to public honesty and encourages autistic daydreaming — the very embodiment of all that is immature and nationally childish. Such national egocentricity — being; unassociated with the changing needs of a changing world — causes the absence of genuine social adjustment. (The resistance of certain crafts in the building industry to new modes of construction is an illustration of engineering experience with this tendency toward egocentricity.) Extreme forms of egocentricity exhibited by so-called leaders and groups is as great a handicap nationally as we know egocentricity to be to the individual. Egocentricity is an obstacle to clear thought and thus to proper action. (To be blunt about a current social problem, if any occupant of the presidency is more interested in discovering those policies which will win re-election than in finding those policies which will forward genuine national interests — then such a political leader is the very incarnation of egocentricity.)

Arbitrary Rule Dangerous

Nationally "emotional instability" is the cause of arbitrary action—the kind of action which the originators of the constitutional system forever sought to preclude. In arriving at national decisions by arbitrary — individualized actions, the struggle becomes one between primitive craving, pitted against mere self-denial, or loyalty to an individual or a group. When the weaker motive furnishes a basis for the decision, the rejected motive often is deferred only later to arise in a disguished form—furthering the instability. At this moment most will agree that the nation certainly is in a highly emotional state. The tendency to modify the fundamental law of the constitution is

extremely strong and change is sought to produce a temporary illusion of "order and security."

In all ages the public demands security, pleasure and opportunity for achievement — the latter being defined as the opportunity to manipulate and explore the strange objects and forms which each new day of science and engineering brings to society. Groups and individuals differ in the relative insistence upon these demands. Some put security above all else, others take zest in manipulating forms and still others will risk much for pleasure.

Freedom Clashes with Restraint

The Dr. Jekyll and Mr. Hyde split-personality of modern political and legal forms need no further elaboration. It is plain for all to see. Freedom and restraint are in clash and that clash produces the schizophrenetic turmoil of the present.

Such are the neurotic symptoms of which America is possessed. Beyond them is that which includes the psychoses or insanities of which dictatorships with their terrorist methods, their torture and blood chambers, are symptomatic. These deadly neuroses are all related to the demand for security, for pleasure and for achievement. With nations, as with individuals, as advance is made from institutional infancy toward institutional maturity, pleasures of the more uncivilized sort must be relinquished, increased responsibility and decreased protection must be anticipated as a matter of course, and h i g h e r standards of achievement must be met. In short, with the coming of national maturity, there will come more responsibility for the individual and the state, less and less individual security, and higher social standards.

The two main steps in eradicating national maladjustments are (1) to discover the source of the troble so that the nation of *individuals* will face the facts and (2) to mobilize the *national will* to make a new advance toward well-adjusted national living.

Wisdom and Virtue vs Intellect

The question of the permanence of democracy resolves itself into the question of whether mankind is growing in wisdom and virtue. The future of democracy is, therefore, related to such matters as national morality and the prospect of human progress — a prospect which is largely in the hands of those in the engineering profession. Encouragement may be found in the reflection that such moral progress as history records has been made chiefly in the way of raising the sentiments and standards of the average man. Whereas in the realm of science it is to the great intellects that the world looks, popular government lives and prospers more by the self-restraint, good sense and good will of the bulk of the nation than by the creative power of great intellects. No form of government demands so much from the citizen as democracy and none gives so much back. Less has been achieved with democracy than had been expected, but nothing has happened to destroy the belief that among the citizens of free countries the sense of public duty and the love of peace, will grow steadily stronger.

The relation between the aspirations of man and their psychological basis poses concrete problems. If the hope for the future of democracy is to be realized, those problems must be attacked now and not in some distant time. Accordingly, the task of the engineer is to identify those problems, analyze them and set at work to solve them. And, above all, he must know the evil side of the first problem of all governments.

Steps to Political Power

The first problem of all governments is the acquisition and retention of constitutionally arrived at "power." The means of achieving legal power are now so well blue-printed that only the barest mention of them need be made. Those who fight for the "common man" use the identical formulas which, in other ages or in other ages or in other nations, were used to defend the position of power of the "not so common man." The beginning step is, of course, the capture of the seat of government. This is often done with slogans designed to convince the citizen of his inability to solve his own problems without the leadership of this or that individual or group. This is followed by the seizure of economic controls or the disturbance of existing controls by imposition of new ones. A subsequent move is to mobilize the forces affecting public psychology — praise and vilification being given without regard to merit or demerit. The steps which follow, of course, are the reduction of all rival forms of authority —regional or local governments—the legislature, the judiciary, and, ultimately (if it constitutes a menace) the military.

The acquisition of power being thus assured, the problem then becomes one of its use and retention. Taxation, debt, educational subsidization, development of programs for first one group and then another group, acceleration of so-called state enterprise are among the tools used. Constitutional guarantees, judicial process and other features of the Constitutional system are changed to accord with the second, if not the first, phase.

Power a Frankenstein

As one who is convinced that there is neither hope nor reason for a return to the jural-political conditions of the eighteenth and nineteenth centuries, your speaker notes that, at its full-stage, "power," becomes a Frankenstein turning upon those who have seized it. Once complete control has been established it is not always possible to limit it and what is lost is nothing less than the whole of that civilization for which man has so often, and so recently, fought. Under the extremes of authoritarianism the "defense of the state" becomes an international problem and so-called territorial sovereignty ceases. The end is war or other catastrophe.

As distinguished from the *first* concern of all governments for power, the other major problems of constitutional government of the next half century may be summarized as (1) the reorganization of the federal administrative machinery to achieve responsiveness and responsibility to the people; (2) the development of needed organization techniques for functionalization of government and the development of better means of staffing government with skilled personnel—of which many must be able engineers; (3) the new problems of inter-governmental relationships—at home and abroad; (4) the task of discovering the twentieth century role of local and state governments in relation to national government.

Add Financial Instability

These problems are set in a framework of possible financial collapse due to misuse of financial powers (on which there are left *no* constitutional brakes whatever), or the making of unlimited promises without relation to the costs thereof, the rating of mediocrity and partisanship over ability, and the absence of a scientific viewpoint.

In connection with a scientific viewpoint it may be said truly that if jurists, economists, managers of capi-

tal, labor leaders, government administrators, all upon becoming aware that before judgment and action a little social scientific research is essential, there would be more and better action rather than less and worse. If all these "leaders" displayed a more becoming modesty to their own intellectual limitations, it would be of some point — but only then — to add that the choice of the best policies, laws and institutions would demand much more knowledge of electricity, physics, chemistry and genetics than such distinguished persons commonly possess.

New Means Required

Both those in social law and those dealing with the laws of the physical science, must seek the discovery of new means of aiding human progress; they must not seek the protection of the personal and property rights of their own clan to the degree that any new thought or development becomes a dangerous thought. The worst sinner of the lot is the collectivist who engages in constant reiteration of the single theme that only through violent upheaval of all constitutional forms can progress be made. This view is totally inconsistent with the view that the best course is the intent to persevere, so long as is possible, in the use of persuasion, education, experiment and research.

The past points up the dangers of violence no less than the dangers of inaction. For example, one cannot catalogue the contemporary problems of government, or the currently adopted measures for dealing with them, without being impressed with their similarity to conditions attending the collapse of the Roman Empire. Respecting the socialism of Diocletian it has been noted that the Emperor's government was a frankly centralized state, which considered local government, like democracy, a luxury of security and peace, and excused its position on the grounds of disturbed international conditions.

Mismanagement That Failed

Diocletian, to overcome depression and prevent revolution, substituted a managed economy for the law of supply and demand; he distributed food to some at half the market price or free to others and undertook extensive public works to appease the unemployed; he brought many branches of industry under complete state control and attempted government guarantee of security and returns. Of course, such a system could not work without price control and in the year 301 he issued the *Edictum de pretiis* setting maximum legal prices and wages for all important articles or services. The preamble of the Edict attacks monopolists who, the Edict declares, kept goods from the market to raise prices.

The failure of the Edict was rapid and complete. Tradesmen concealed their commodities, scarcities became more acute than before, riots occurred, and the Edict had to be relaxed to restore production and distribution. One weakness of Diocletian's managed economy lay in its administrative cost. The administrators found their tasks too great for human integrity, their surveillance too sporadic for the evasive ingenuity of men; taxation rose to unprecendented peaks and the flight from taxes became almost epidemic; the rising cost of doles, public works, armies, the depreciation of the currency; the discouragement of ability and the absorption of investment capital, the straight jacket placed on agriculture and the creation of caste for industry — all these conspired to sap the material bases of Roman life until, at last, the power of Rome was a political ghost surviving its economic death.

Today May Be Different

The denouement today, in an era sixteen hundred years after these events can be different from that which followed upon Diocletian. There need be no regression to centuries of "twilight" — no modern counterpart of the dark ages — *for the conquest of the human environment has progressed, even if the development of a science of human nature has not progressed adequately.* A frank acknowledgment of current institutional defects and a militant attack upon governmental problems are the pre-requisites to human progress.

As the world crisis for democracy and constitutional government was gathering, Hogben pointed to both the chief defects of the constitutional system and to the basis for future hope. He observed that the wealth of nations depends on the social resources for mobilizing the common will to make the fullest use of mankind's material and biological supplies.

All living now know that the nations of the West blundered into an era of coal and steel without much preparation and now are at the threshold of improved communication and transportation, possibly unlimited supplies of natural energy, modification of the heavy metal economy and a vast realizable increase in productivity of field, stock and crop.

The alternatives to some intelligent study of the available material and human resources are cults of insurrectionary violence which will inevitably breed a successful and ruthless reaction or an acquiescent opposition, content to gather only crumbs from life's great potential. Gentlemen, that task is in your professional hands and the unfinished part of it is for the hands of those engineers who come after you.

You who are trained to action must take up the task, for the process of selection of leadership in constitutional democracies generally has operated, as Hogben notes, to recruit the nation's statesmen from those who can talk glibly, write elegantly and argue forcibly without the capacity to act competently. And unless this can be changed, democracy may be finished. So the conclusion follow:

Three Conclusions

The *first conclusion* is that the paralysis of the human will to mobilize the vast resources for human betterment now available cannot be arrested unless all are willing to face a far more drastic revision of the ideas carried forward from the nineteenth century than have been faced so far. The engineer, and not the jurists and economists of the Austrian school, must take leadership in combining human effort, materials and natural resources to increase the use of the gifts of individual men for the common good.

The *second* conclusion is that no more constitutional change should come on the basis of class warfare. Class warfare is out of date. It is crude — too crude for an age of finesse. In America the salaried workers of urbanized society henceforth will be the most important elements strategically. Yet that fact is beside the main point which is that the dissatisfaction with the plan of life which exists now is not confined to, or even the most articulate among, the depressed sections of society. To discover the means of progress there must be a moratorium on mere talk, and responsible leaders must see to it that social psychological research is genuinely advanced.

Don't Fear to be "Different"

The *third* conclusion is — and one of profound importance in future

Labor Laws and Human Relations

By Thomas M. McCabe

An Address Delivered Before the Senior Engineering Class of the University of Minnesota

I am going to ask you to put aside your slide rule — to forget your Algebra, Geometry, Trigonometry and Book of Logarithms for just this period. I want you to leave your more exact science and follow me, if you will, into another field. In your profession you are and will be working with equations—exact equations which start with definite mathematical symbols and follow specific steps and formulas to a specific solution or answer.

However, the equation which I wish to discuss with you has none of these exactitudes. It is not one that has a definite starting point or a specific answer. There are no set formulas which you can use and arrive at the same answer and solution each time. It is as variable as the winds. It cannot be calculated. You might apply one formula at one time and get one answer and apply the same formula a second time and get a directly opposite solution. Yet this equation is just as essential and necesary to the Engineer in the practice of his profession as the whole science of Mathematics. By now I am sure you recognize that it is the "human equation" to which I refer. You may be the best engineer in your field — you may be able to design the best bridge or mechanical structure known to man, and yet without the brains and brawn of other men, your profession will avail you little.

THOMAS M. McCABE was born June 11, 1896 *at Baker, Minnesota; High School, Minnesota College, Minneapolis, Minnesota,* 1919*; University of Minnesota, B.A. and L.L.B.,* 1924*; Admitted to Bar,* 1924*; Delta Sigma Rho, Honorary Forensic; Phi Alpha Delta, legal fraternity; Practiced law in Duluth since* 1924*, Firm — MCCABE, GRUBER, CLURE & DONOVAN. Specializes in law of Labor Relations; Instructor — University of Minnesota Extension — in "Legal aspects of Labor Relations."*

Not a One-Man Job

Let us build your Bridge. First, it is conceived in your imagination. Then, painstaking step by step it grows from your mental image into drafts, sketches, and calculations until finally it begins to take form and your mind plus the ingenuity of other minds and hands become a part of it — and the construction is on its way. Then a different group of hands and minds take over and gradually you see your brain child develop into a beautiful engineering structure of which you dreamed; but, through the whole process is the combination of things — of plans—the hands of other men. Thus, the human equation becomes as all-important to the Engineer as the science of his profession.

Here in school and later, you may if you wish, revel in theory and in science but unless you can apply your theory, and our science can be used for the good of man, then you become of little value to yourself or to society.

Labor Unions Participate

Now, let me take you rudely, if I may say so, from the realms of your classroom, science and theory, and let me place you upon the approach of the Bridge you have conjured up in your imagination. I place you on the approach to the Bridge to see a large group of men gathered there. You walk toward the Bridge — you see a sign but you do not stop to read it but continue on your way up the approach to inspect the first girders that have just been laid across the last span. You are all intent upon the beautiful engineering spectacle before you. In a moment an arm grabs you roughly and someone says: "Say, who in Hell do you think you are? Can't you read? What do you mean going through our picket line?" You look up and glance at the sign and for the first time you read the sign which says: "THE WAYWARD CONSTRUCTION COMPANY IS UNFAIR TO ORGANIZED LABOR" and you find you have committed the unpardonable sin of crossing a picket line. You ask someone why the Wayward Construction Company is unfair to organized labor and you are told they would not sign a collective bargaining contract with the Overnight Union and so the Company is unfair to the Overnight Union. You remember that just yesterday the Superintendent of Construction had told you that a great majority of the employees belonged to the Continuous Workers Union which had had a verbal agreement with the contractor for a period of many years and there-

elections — a political group wishing to constitutionally rally all the genuinely progressive forces to the rehabilitation of the West has nothing to gain by a weak-kneed attempt to convince its would-be supporters that it is not essentially different from its competitors.

Lord Bryce, writing after the close of World War I, said that any free people that has responded to the call of duty and come out of a terrible ordeal unshaken in courage, undimmed in vision, with its vital force still fresh and strong, need not fear to face the future. Without faith nothing is accomplished, and hope is the mainspring of faith; hope, often disappointed but always renewed, is the anchor by which the ship that carries democracy and its fortunes will have to ride out this latest storm as it has ridden out many storms before.

In the midst of much that is transitory about your profession and mine there is in it a strain of duty which, if discovered, is like holding infinity in the palm of your hand and eternity in an hour. Find that strain and your quest is over.

THE END

fore, there was no danger of any labor trouble during the construction of your bridge.

Rule By Opinion

"What happened," you ask, "to the Continuous Construction Workers Union?"

"Oh, that outfit" you were told by a worker, "we used to belong to them, but some of us changed our minds last night and joined the Overnight Union so the Company has got to sign up with us."

"So that is why," you say to yourself, "the Wayward Construction Company is unfair — because someone changed their mind over night."

The Human Equation which you will be required to deal with is just about as stable as this illustration I have just given you. I am not here, however, to tell you how to solve the enigma of the human equation. I have no such miracle to perform. All I can do in the brief time I have is to tell you that society has certain rules to regulate "Homo sapiens" when he decides someone is unfair and starts to publish it to the world. These rules are laid down by State and Federal laws. They are a start, and I regret to say a very poor one, at what we hope may eventually bring us at least a degree of industrial peace. So, let us apply what few rules we have, as unsatisfactory as they may be, to the men at your Bridge.

Jurisdictional Disputes

You find, upon talking to the Superintendent of the Construction, that there has developed among the workmen what is known as a jurisdictional dispute. The Continuous Construction Workers Union is affiliated with a National Union and a majority of the workmen on the Bridge belonged to that Union until last night. It appears that during the last two or three weeks the representatives of the Overnight Union have been doing some organizing among the workmen and getting them to affiliate themselves with the Overnight Union and when they had a substantial number of workers signed up with their union, they called at the office of the Construction Superintendent at 11 o'clock that night and informed him they wanted a conference immediately and wanted a new contract. The Superintendent told them they had an agreement with the Continuous Construction Workers Union, but they said they had now changed their affiliation and therefore, they do not want to continue with the Continuous Workers Union but that last night they decided to affiliate themselves with the Overnight Union and now wanted a written contract with the Construction Company. The Construction Company therefore found itself between two fires. Both unions were now demanding a written contract and the Overnight Union was picketing the Bridge and all work was stopped on the project.

Wasteful Legal Delays

The Employer immediately conferred with his lawyer and was advised that where there was a jurisdictional dispute between two unions that the Employer could file a Petition with the National Labor Relations Board and have an election. This was a partial solution to the problem which would take from 15 to 20 days but in the meantime work on the bridge has ceased. You go back to your shack on the Construction Job and for the next 15 or 20 days you ply through your blue prints, you make changes in drafts, you review everthing you have done and doodle on your pad for lack of anything better to do and wait for the wheels of Government to turn out a decision which will let the men go back to work on your Bridge.

Finally a hearing is held and you attend. You hear both unions claim they have a majority of the workers on the Bridge and the Hearing Officer takes evidence as to the total number of employees on the payroll and when the dispute arose. After the hearing, you are advised that in a day or two an election will be held to determine the collective bargaining representative. An election is held and it is found that the Continuous Construction Workers Union had a majority of the employees on the payroll at the time the dispute developed. Accordingly, the National Labor Relations Board certifies that the Continuous Construction Workers Union are entitled to the bargaining rights and the employer may now bargain collectively with that union.

You go back to your shack among your blue prints, your sketches and designs feeling that now tomorrow morning you can go back to your work and find your beautiful Bridge again on its way to completion; but, what a rude awakening you have again next morning when you come to the approach of the bridge and find the same condition and the same sign: "THE WAYWARD CONSTRUCTION COMPANY IS UNFAIR TO ORGANIZED LABOR."

More Complications

You observe, however, that a large number of the employees are now going through the picket lines and are now going to work on the bridge. They, of course, are the members of the Continuous Construction Workers Union. Their union has ordered them to go through the picket lines. They are now the bargaining agent and their members are going back to work.

However, a small band of employees who joined the Overnight Union insist on picketing. Shortly after your arrival to the approach to the bridge a large truck containing material necessary for the Continuous Workers Union members to continue their work, drives up to the approach and stops in front of the sign and the picket line. The driver has a word with the man carrying the banner who tells him that the Wayward Construction Company is unfair to their union. The truck driver asks for nothing more, backs up his truck and turns around and goes back without unloading the materials, and so it is all day. No materials can be delivered so tomorrow morning and the morning after we find the number of workers who go to the bridge become less and less because the flow of materials has been cut off. Because of the lack of supplies and materials they cannot return to work and so from a practical angle we are back just where we started.

Legality Supercedes Reason

So again the Construction Superintendent goes to see the lawyer who tells him this time—"There is nothing I can do for you and as the Supreme Court says: 'The right to picket is a right of freedom of speech and any man has a right to picket.'" "As a man may thinketh in his heart" that blankety blank employer is unfair to organized labor, so he may say it on paper and so he may say it on a sign on his shoulder, and so when he walks on the approach to the Bridge, he is exercising his constitutional right, of Freedom of Speech, says the present Supreme Court. Even though the law of the land by fair hearing and all, has decided that the Continuous Workers Union is entitled to bargain collectively, and even though it would be unlawful for the employer under such circumstances, to recognize or bargain with the Overnight Union, this union is still permitted to picket —unlawful and ridiculous as it may seem.

Financial Interferences

Perhaps weeks or months may go by before the Overnight Union gives up in despair and finally abandons the picket line — but, in the meantime the day is approaching when your Construction Company has agreed to have the Bridge completed and because of the several weeks' or months' delay, there are now only a few days more to go before the final date called for in the construction contract; yet there is three months' work to do on the Bridge and the contract calls for $500 per day under its Performance Bond for each day it runs over the completion date specified in the contract.

Finally, after several weeks the Bridge is completed but the Contractor who undertook the construction has now a penalty to pay of $150,000 by reason of the delay. His profit on the bridge is not only gone but the company itself is probably on the verge of bankruptcy.

But let us leave the Bridge now for a moment to inquire into the ordinary means of investigation and certification of representatives.

NLRB Certification

What I have just given you outlines generally how the Act operates. After a dispute arises between an Employer and his employees with reference to whether a particular union is entitled to bargain with the Employer, the Union may petition the State Conciliator or the National Labor Relations Board for a certification, and if they have a majority which is usually determined by an election, then the union is certified and the Employer bargains with the union and a contract is made, closing the matter for the period of the contract. Under such circumstances the Employer is not entitled to make a request for a certification. In the ordinary case, the Union has the right to request the certification but in a case such as the Bridge Case I have just illustrated to you where there are two unions both claiming bargaining rights, then in such a case the Employer may request certification.

There are certain other provisions, of course, in the State and National Acts but the principal purpose of the enactment of both Acts was to secure to the employees the right of collective bargaining, and before they can bargain collectively they must establish they have a right to bargain and their right is made contingent upon making the majority representation of employees in a particular unit. What constitutes a proper unit would take hours for me to illustrate to you. However, in the ordinary case it is the group which is desirous of bargaining with the Employer, exclusive of clerical, confidential and supervisory employees.

Collective Bargaining

In addition to setting up the machinery for determining who the Bargaining Agent may be, the National Act also provides for certain protection for the employees against interference with the right of collective bargaining. For example: The Act provides: "It shall be an unfair labor practice for an employer to interfere with, restrain, or coerce employees in the exercise of the rights of collective bargaining . . ."

and the Act forbids the Employer — "To dominate or interfere with the formation or administration of any labor organization or contribute financial or other support to it."

The Act also provides it is an unfair labor practice for the employer to discriminate in regard to hire or the terms and conditions of employment, or to encourage or discourage membership in any labor organization, except that an Employer may enter into a Closed Shop with a labor organization. The Act also makes it an unfair labor practice for an Employer to refuse to bargain collectively with the representatives of his employees who have been certified under the procedure which we illustrated by your Bridge case.

The "White Line"

In other words, the National Act draws a white line between the Employer and the Union and forbids the Employer to cross that white line. He must leave the organization of the union strictly alone and allow it to work out its own affairs and when it makes a demand, it can refuse to bargain only at its peril because it is the duty of the Employer, under the Act to bargain with the union having the majority.

It is not necessary that the Union require a certification to the Board. It is only necessary that it have a majority. If it has a majority it has a right to bargain. The National Act does not provide for any unfair labor practices on the part of the Union. It is a kind of one-sided, or perhaps we could say lopsided Act. It is called by many Union Leaders the "Magna Charta" of Labor and many times that is true because for the first time the Employer is forced to bargain collectively with a union and certain safeguards are put around the collective bargaining rights so the collective bargaining process is protected.

Under the State Act there are certain unfair labor practices on both sides. In other words, the State requires not only the employer to bargain collectively and makes it a violation for him to do the various things I have enumerated as unfair labor practices, but also says it is an unfair labor practice for a union to violate a contract, to institute a strike in violation of our 10-day cooling off period and to do various other acts which the State Act enumerates.

Engineers and the Unions

Let me return to your Bridge. During the construction process you, of course, had a number of draftsmen and other technical men who were graduate engineers working under you, and when the dispute arose between the unions you found that one or two of your men who were in the lower paid brackets who were young engineers just out of school, had joined the Overnight Union.

Upon investigation you determine that their wages, of course, are very low — barely enough to exist on and the young engineers were tempted by the rosy picture painted by the Overnight Union when they told them they not only could greatly increase or double their wages, but in addition they would get overtime for all the long hours they were working on your blue prints, sketches and designs, and some of these young men, following the Primrose Path of a few dollars, decided to forget their professional standing for the time being and become ordinary draftsmen even though in their minds they held for the future the same dream you had of becoming a Structural Engineer.

Upon talking with these men you agreed that their rates had been too low and you agree to make some adjustment in their rate but you find all too late. In the first place, having joined the Union and bargaining rights having been demanded, the Union was now claiming that all of the engineers in your group except yourself and one or two assistants were being claimed by the Overnight Union as belonging to the particular unit for whom they were demanding bargain-

ing rights. That is, they claimed all the workers on the Bridge together with the technical men and draftsmen in your organization.

Workers or Professionals?

Upon talking further with your organization, you find that they are torn between two fires. Should they yield now and become members of the union and affiliate themselves with the workers or should they claim that they were professional employees; that the type of work which they are doing required skill and training; that they are the members of a profession — not merely skilled workers. After much argument and persuasion you point out to these men that they are, in fact, apprentices — that they are learning by doing — they are serving their internship as a young doctor does after his medical training, and now it is for them to decide whether they shall cast their lot with the workers and become ordinary skilled workers belonging to a labor union unit or whether they should set themselves aside as members of a profession, aspiring and accomplishing just as you have done, to become a world renowned Structural Engineer. Finally, just before the hearing, one of the young engineers who had joined the union, comes to you and tells you he did not realize what he was doing at the time — that his father belonged to a union and that he had always been friendly towards unions, but now he realized that if he is to advance in his profession that his lot is with other Engineers, not with the skilled worker.

Then, without reflection upon the union which claimed them but merely upon the basis of the fact that their roads go in different directions, he or his associates have decided to request the Hearing Officer to set aside all Engineers and those associated with them and doing similar work, as Professional emplovees so that they might work with their own profession. So, as the workers go back to work and as your engineers go back to work on your designs and sketches upon your trestle board, all of you are deeply gratified that your engineers have seen fit to maintain the integrity of their profession.

The Solution

GENTLEMEN: What has been accomplished by you at the Bridge is the battle which the Minnesota Association of Professional Engineers and your National Association has been carrying on for the last ten years; an effort to maintain their integrity as a profession as against the inroads of others who may be over-ambitious to extend the jurisdiction of the worker into the professional fields. The Unions in their enthusiasm are to be greatly admired for the splendid advancements they have made for the cause of the worker, but the question you must always have before you is:—Are you a worker? Do you belong to a worker's group or to a professional group? Keep that in mind and when you become an Engineer, work with your Association which has so diligently worked to maintain the integrity of the profession and greatly advanced the standing of the Professional Engineer in the State of Minnesota. When you leave the University and receive your degree, let me commend you to the guidance and advice of these splendid men who are so unselfishly giving of their time and efforts to the advancement of their profession.

National Issues — Washington Economic and Political Front

At this writing price control is still the "hot" issue in Washington. Congressional mail is heavy, and 95 percent against taking off the lid. The result of this uproar has been an unprecedented degree of political hedging. The "anti" people profess to be in favor of controls, but "insist only on a better administration." Most people believe business interests want to throw all control overboard. Cotton and other agricultural organizations are also opposing the controls, but they do not always represent the interests of the grass roots farmers. It may be significant that economists of the Committee for Economic Development, recommend that price controls be continued.

Shrewd judges of political reaction in Washington believe that business interests have now maneuvered themselves into a position where they will be held responsible for whatever serious inflation does come, whether due to controls or the lack of them. "Business has been playing with fire, on the price control issue," is the common expression among political forecasters.

Whose Press Is Free?

Newspaper editors from all over the world held a conference in Washington recently. Russian editors told the Americans that news of economic matters is freer in Russia than it is here. The difference is that Russian censorship is by government, here it is by pressure groups, business, ethics and religious.

Paris Peace Conference

The Paris Conference at present is proclaimed as "hopeless" or "encouraging," depending on what newspaper you read, or radio commentator you hear. It appears to be a contest, with Russia on the one side, certain that her former allies are plotting, as they did before the war, to fence her in. And on the other side, there is suspicion that Russia intends to break out of the ring that has kept her away from warm water ports for centuries. Walter Lippmann is one of the few well known writers who has been courageous enough publicly to paint the picture pretty much as it is. In the meantime, officials of the so-called democracies are driven frantic by the realization that Russia is the only nation which may gain by delays in the stabilization of conditions in Europe.

Undoubtedly Russia's policy is one of embarrassing Great Britain and America, or "showing them up" as the fascist appeasers she considers them to be. Her handling of the Iranian issue is an example, intended to expose the "bad faith" of the Anglo-American bloc in the U. N. The Franco matter is another instance clearly designed to prove democratic duplicity. Issues involving Egypt, India, Greece, Belgium, Indonesia and probably Italy, are among those that we may expect to see "planted" in the lap of U. N. for the same purpose. Russia knows these are issues which we are not yet ready to face.

Loan to Britain

This column has predicted the passage of the British loan. Recently this bill has seen hard sledding in Congress. Opponents avoid a frontal attack in most cases, exactly as in the case of OPA, or going back 25 years to the fight on the League of Nations. Business pressure is secretly for the bill and that is responsible for the bill's passage. Loans mean busy factories

and less unemployment, because they supply the otherwise scarce buying power. What somebody called "milk man" economics, still prevails.

Senator Johnson, of Colorado, is quoted as saying he fears this is but the first of several foreign loans that will be proposed. He's undoubtedly correct. The Senator fears such loans may bankrupt the nation's economy. On that issue, economists are divided on a 50-50 basis. This illustrates what Stuart Chase has to say in a recent article in "The Nation:" "There is not now and never has been a genuine science of economics." Economists never have used the clinical, the laboratory approach. As Chase says, they just "sit and think," and then dream up verbalisms such as "laissez faire," "capitalism," "socialism," "communism," "social credit" and dozens of other 'isms and 'ologies. But Mr. John Q. Public, in general, still believes in the existence of "economic laws," despite the contrary behavior of our economy through many decades.

Before this appears in print we expect Mr. Truman to take over the coal mines. At the moment there appears to be a hitch somewhere. Something must be done, and there is little originality in Washington political circles. Just about everybody is kicking John L. Lewis around. John evidently needs a good public relations man. Such a man might point out that "it takes two to make a strike, as it does a fight." Or he might remind the public that, "No good businessman can sell his goods (or services) at a loss and stay in business. And again, "How is John worse than the follows who won't produce shirts?" The miners can't make a profit under the terms and working conditions of the old union agreements." Or if he wanted to be really sarcastic he might quote from Adam Smith's "Wealth of Nations," which is the source of all conservative economic ideas, to the effect that: "When men individually earnestly pursue the gaining of their own selfish ends, they are guided, as by the hand of God, to work also for the common good." And finally he could suggest that, "So long as coal production, (which has little actual function other than a PUBLIC FUNCTION) is operated as purely a personal and private business enterprise, you the public, must resign yourselves to certain discomforts, in order to preserve the 'freedom of private initiative'!" But John probably prefers to conduct his own relations, public or otherwise, and he never has gained renown as a diplomat.

Consumer Savings

Washington economists are doubting the statement there is a vast backlog of available savings likely to go for consumers' goods. They point out that of the 58 billions of savings reported, 43 billions are in the hands of only 9 percent of the more prosperous families. It is expected that much of these bigger holdings will go into some form of investment, rather than be spent for consumer goods.

Internationally-minded Washington officials are deeply concerned about the seriousness of famine conditions in Europe. Apart from the human suffering involved, the future peace of the world may be made infinitely more difficult.

Equally disturbing are the reports of political conditions in Germany. Instead of inflicting a "hard peace," there appears to be evidences that in each of the occupation zones, German strength is being built up as during the early Hitler regime, to be used as a tool — a very powerful aid in World War III. These are the conditions which American newspapers refer to only as "extremely delicate," or "explosive." Obviously these terms convey no adequate meaning to the average American reader. The gap between the "Engineering Approach" and political intrigues, appears to be vast indeed.

Need for an Over-all Engineering Society

By James P. Munroe

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James P. Munroe

Mr. Munroe graduated from New York University, 1932 with B.S. in Electrical Engineering. Associate Member AIEE, Member of the Dayton Society of Profesional Engineers. Registered in Ohio and New Jersey. Junior Engineer, Electric Dynamic Works, Assistant Engineer, Watson Elevator Company, Eastern District Engineer, Dayton Rubber Mfg. Co. At present Mechanical Engineer with Research Division, Dayton Rubber Company, Dayton, Ohio.

The writer read with considerable interest the summary of the annual meeting of the Engineers Council for Professional Development as reported in the December issue of *Electrical Engineering*, pages 461-2. The work being carried on by that organization would appear to be well considered and executed.

The writer is somewhat puzzled by one important omission in the discussions regarding uniform membership grades and profesional attributes. The professional engineering laws now in effect in most states would seem to bear directly on these matters and particularly the professional attributes.

Professional Recognition and Legal Status

The subjects of professional recognition and of legal status are related almost inseparably. The professional engineering laws offer a suitable means of specifying and instituting legal minimum qualifications for engineers and for putting a stop to the present misuse and abuse of the title "engineer" by so many unqualified persons. It is useless to argue that there may be better methods of providing minimum standards than the professional engineering laws. Many of those laws have been in effect for a considerable period of years and the process itself is becoming thoroughly ingrained. It is difficult to conceive any

other means by which legal status can be conferred. It is much too late to contemplate turning such authority over to the technical societies. Furthermore, while the great technical societies centered at 33 West 39th Street, New York, have high standards, there are a multitude of other so-called "engineering" societies and it would be a legal nightmare to sort them out on a basis of responsibility.

The ECPD recommendations on uniform membership grades seem quite reasonable. The qualifications recommended for members are strikingly similar to those required in most states for a Professional Engineer's License. Certainly any institution of uniform membership grades would require a transition period. This well might be accomplished first by recognizing a Professional Engineer's License as qualifying an Associate or non-member for the grade of Member and then at some suitable future date making such license mandatory for the grade. There would seem no point to the Institute's conducting separate qualifying examinations when almost all of the states and all of the Canadian Provinces already have in effect licensing laws with almost identical requirements to those suggested by ECPD.

Discussion Without Action

One disturbing item in the report is the indication that for 12 years the ECPD and the major technical societies have discussed uniform membership grades without being able to come to any decision. The same fate seems to have overtaken many of the important professional activities the committee normally would be expected to deal with. This situation lends emphasis to the proposal for an over-all professional engineering society as first outlined by C. A. Powel and later given concrete expression by James F. Fairman in their respective articles in *Electrical Engineering* (*January* 1945, *pages* 14-16 *and June* 1945, *pages* 220-3).

The Founder Societies and their fellow major technical societies have accomplished an outstanding success in their respective technical fields. Unfortunately the characteristics which have carried them to these successes have kept them from functioning effectively on professional activities and co-ordinating with one another. It is all very well for the ECPD to debate, discuss, and submit propositions and proposals to the societies who then individually sit down, consider, discuss, and perhaps reject so that the matter goes back to ECPD for further study and so on.

NSPE Has Major Attributes

The only alternative to an over-all professional society would seem to be some organization or council of the major technical societies constituted of representatives with power to act as well as talk. The fate of the American Engineering Council does not augur very well for the success of such an enterprise. It was after thorough consideration of these facts that the writer first secured a Professional Engineer's License and then joined the National Society of Profesional Engineers. That group is as yet rather weak numerically but it seems to have the major attributes required for a successful professional society — it can and will be built into the powerful over-all professional engineering society that is needed so badly. In Ohio that thought seems to be gathering strength among engineers.

Please understand that the writer has no intention of belittling ECPD or the AIEE. If ECPD carried out no other function than that of accrediting engineering schools its existence would be justified. The writer has been affiliated with AIEE since 1930 and fully appreciates its leading position as a technical society. The failure of the technical societies to cope with professional developments must be recognized.

Needs Looking Into

It is suggested that AIEE propose a joint committee of major technical societies to look into the matter of an over-all professional society and issue a joint report. Perhaps this matter could be referred to ECPD but in any case a time limit should be set and a *definite report* demanded. In any such committee the only functioning responsible professional society, NSPE, must be given adequate consideration. Thirteen years have gone into making NSPE a sound and going organization and they should not be thrown away lightly unless there is a very good reason. It should be kept in mind that the vast majority of NSPE members are also members of one or more of the technical societies and that for the forthcoming year one man, James Fairman, will be a vice-president of both AIEE and NSPE. In short it is time to call a halt to the endless round of talk about forming a suitable professional organization and resort to some concrete action.

EDITORIALS

Are Slide Rules, or Crystal Balls To Guide America's Future?

It has been said that many highly-placed Americans, in spite of their superior educational advantages, still "believe both in science and in magic."

As one Congressman put it a few days ago, "Many Americans face social problems with a slide rule in one hand, and a crystal ball in the other."

That off-hand Congressional wisecrack probably comes nearer the truth than its author realized. For our high energy productive processes were created and their operations are controlled by the "Knights of the slide rule" — the Professional Engineers.

But when it comes to the method by which we distribute that output—that's another story. Here the engineers' techniques are disregarded. In this second half of our operations, we use more or less "crystal ball" devices which are lacking in any element of Engineering methods.

Little Balance Between Subjective and Objective

For example, we distribute on the basis of price. Prices are synonymous with nothing except "exchange values," which have an elastic quality that forever defies all efforts at exact measurement. Profits and dividends go to stockholders to provide them with purchasing power. Titles to property are the basis of this distribution.

A further distribution of buying power goes to workers. Here the basis is "wages." The amount of the purchasing power thus distributed is based on a supposed "fair value" of the services rendered. It is not strange that the total "wages of ownership," plus the "exchange value" of personal services — both based as they are on often whimsical rather than engineering criteria—never seem to balance up in their totals in a way to provide a

full market for the capacity output of our technological system of production. Production processes are directly related to the slide rule, while the allocations made in purchasing power are closer to the uncertain magic of the crystal ball.

What Professional Engineers must realize, when they confront social-economic problems, is that in any stable economy, consumption should be teamed up equally with production. Otherwise we can hope for nothing better than an oscillation from plenty to scarcity and back again. It certainly is possible to keep production and consumption in balance, whether the rate or the volume be high or low. Instead of a balanced load economy, we have experienced scarcity of essential items in depression periods, with black markets whenever people have plenty of money to spend.

An Engineering Job

Sooner or later, the Professional Engineers may expect to be shouldered with the problem of *designing a system of distributing* the socially produced commodities of our factories and farms. America may say to Engineers: "Your designs for production are the wonder of the world... .You must now point the way to an equally efficient and serviceable method of finding a market or all your machines can produce. This appears to be the only way to end the present intolerable jumble and fumble so evident in the whole field of political and economic affairs."

This demand upon the ingenuity of the Engineer may come sooner than anybody imagines. This means far more than just "taking a more active part in civic affairs" — maybe joining the P.T.A., or the Public Welfare Board. It means that Engineering science must design our system of distribution as it has so successfully designed our productive apparatus.

Can Engineers Qualify

The danger, of course, is that there may not be enough Professional Engineers with the necessary sense of social responsibility; not enough men with the necessary detachment from mob sentimentalities or political ideologies. Too many Engineers still cling to the folkways of the past, or to ego-centric geographical or political prejudices. Too many still insist that all problems must be solved, as Mr. Truman once remarked "within the framework of the institutions in which we traditionally believe." Such thinking would appear to utterly disqualify Engineers (quite as much as it does others) from ever fulfilling what now appears to be their inevitable destiny.

For there must be no "whip sockets" built into the design which is to make possible America's future grandeur.

Comments on the Scientific Method Applied to Management and Organization

The scientific method involves, among other things, a systematic, positive and purposeful use of analyses and syntheses, a constructive use of creative imagination, the investigation of pertinent hypotheses, and finally the rigid exclusion of all non-essential elements, all preconceived notions, opinions, precedents, arbitrary dogmas and authorities.

The procedure is first to define the major objectives, collect all pertinent facts, analyze past experience, set up standards of performance, schedule a scheme of operations, select personnel and set up organization, delegate responsibility and authority in combination, devise appropriate stream-lined methods of supervision.

The foregoing may be summarized in five words: analyze, synthesize, organize, deputize, and supervise. Avoid the tendency of allowing department heads or subordinates to develop into what has been called "procedure operating executives," or to use a slang phrase, "paper pushers."

History May Not Repeat

It is essential that we avoid looking at present situations altogether through the glasses of the past. We must make a close accounting of the ways in which conditions have changed. Too often the tendency is to assume what has been must still be. It is a serious mistake to assume that the known operating characteristics of policies and persons generally as employed in the organization and which embody to a great extent our plans and expectations, will be in essential respects different than the same policies and persons have demonstrated in other similar situations.

In short, we can not expect those policies that are known to have failed in the past to succeed in the future unless the conditions under which they are employed have changed in a way to materially affect the results.

Correcting an Error—NSPE Representation on Engineering Joint Council

An error appeared on page 21, of the April issue of the American Engineer respecting President Ritchie Lawrie, Jr's. appointments of NSPE representatives to the Engineers Joint Council's Committee's on the Economic Status of the Engineers. This announcement should have read:

Mr. John S. Kennedy was chosen to serve with the sub-committee entitled "Committee on Collective Bargaining by Engineers in Professional Work."

Mr. William F. Ryan was chosen to serve on the sub-committee entitled "Committee for Survey of Employer Practice Regarding Engineering Graduates."

Mr. Alex Van Praag, Jr., was chosen to serve on the sub-committee entitled "Committee on Survey of the Engineering Profession.

The members of these several committees held a meeting in New York City on May 21.

What Do You Think?

One purpose of an Editorial Department is to stimulate thought and discussion on the part of our readers. We have to a degree failed in our purpose, if we are not able to move some readers to "come back" with comments of their own for publication in the American Engineer.

In cases where something you read in these columns causes you "strongly to agree or disagree," we'd like you to dictate an editorial, an article, or maybe just a "Letter to the Editor" for publication.

Our readers, as well as the editor will profit by reading what you think. By taking the trouble to do this, you will contribute substantially to making your magazine more interesting and readable.

And so, why not let us have an article, or even a letter, expressing your point of view? Write on some subject you've seen discussed in these pages —or maybe on some issue you'd like to see brought to the attention of professional engineers.

We hope you do not put off doing this.

Expanded Circulation Of The American Engineer Proposed

By W. H. Larkin, Chairman,
Publication Committee

The report of the Publication Committee at the March Meeting of the Board of Directors in Columbus presented a program which contemplated sending The American Engineer to all 90,000 registered professional engineers in the United States. The Board of Directors authorized the publisher to make a survey, both as to the cost involved in such an undertaking, as well as definite commitments on advertising which could be secured on this basis. The publisher's report will be presented by the Publication Committee for complete appraisal of the Executive Committee at its meeting on July 17th.

This program has much to be said for it, and the Publication Committee, as well as the Executive Committee has been giving it serious thought. The program involves a number of considerations, all of which will be carefully weighed before the Society is committed to the increased distribution of The American Engineer. It is felt, however, that the following advantages would result for the Society if the program were accomplished.

All Professional Engineers would have made available to them; (1) the excellent articles and information contained in each issue, (2) the objectives and plans of the Society, (3) the activities and accomplishments of our organization, (4) the progress towards common goals which the Society offers to the profession. We would be able to spread more effectively than by any other means the philosophy of an engineering society concerned solely with the social, economic and professional status of the engineer. Members of N.S.P E. should consider, these advantages carefully.

How Can It Be Accomplished

As most of the Society members know, a sizeable budget must be appropriated yearly for the maintenance of The American Engineer. This budget is required because of the reluctance on the part of advertising executives to use this medium of advertising since its circulation does not fully cover the engineering field. With the expanded program it is contemplated that this attitude would be offset, and increased advertising in The American Engineer would compensate for the cost of larger circulation. It is believed that the members of N.S.P.E. will wholeheartedly endorse this program. The Publication Committee is anxious to have an expression of opinion from the readers of The American Engineer as to whether or not such a program would be feasible.

Many of the members have contacts with sales and advertising people. They may be able to express an opinion for the guidance of the Committee indicating the probability of securing increased advertising in a publication having a circulation of the scope contemplated.

CHECK THE COUPON herewith, and return it to the undersigned TODAY. There is no time to lose. We must have all responses in for consideration at an early meeting of the Society's Executive Committee.

Also write me a personal letter, if possible. Give me your comments, and suggestions.

Address your reply to Mr. W. H. Larkin, Chairman, Publication Committee, National Society of Professional Engineers, National Press Bldg., Washington, D.C

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Registration of Professional Engineers

By George M. Shepard

An address given in a series on "Professional Problems," to Senior Engineering Students, University of Minnesota, February 5, 1946.

Previous speakers have addressed you on the social, ethical and economic phases of the engineering profession particularly with relation to the interests, desires and ambitions of young engineers. When the chairman assigned me the subject of "Registration of Engineers" he said that the outline attached to his letter could be followed or not as the speaker desired. If you have by any chance seen the outline and do not recognize the talk, please do not hold it against me as it always has been difficult for me to follow a fixed outline.

Basic Definitions

Perhaps it would be a good idea to start from scratch with a definition of both "Registration" and Engineer." Webster's unabridged dictionary defines registration as the act of enrolling or recording formally and exactly as for future use or service. Custom in the engineering profession, perhaps based upon a distaste, in the early years, of the term "licensing," has generally followed the designation of "registration" rather than "licensing" in defining the means by which the individual is legally inducted into the profession.

The term "Engineer" unfortunately for us has such a hold on the public imagination that its use covers every activity from the highest type of professional engineering through the various classifications of equipment operation to such commercial designations as exterminating and dry cleaning engineers. We must then fix in our mind a proper definition for "our" type of engineering and see that any encroachment or improper use of the professional term is promptly dealt with by the engineering societies or the legally constituted boards of registration. The provision in the Minnesota Law covering misuse of the term "engineer" will be subsequently quoted.

The Term "Professional"

At a conference of representatives of national engineering organizations held in New York City last August, at which meeting I was one of the representatives of the American Society of Civil Engineers, the following definition was adopted:

"The term professional engineer within the meaning and intent of this Act shall mean a person who, by reason of his special knowledge of the mathematical and physical sciences and the principles and methods of engineering analysis and design, acquired by professional education and practical experience, is qualified to practice engineering as hereinafter defined, as attested by his legal registration as a professional engineer."

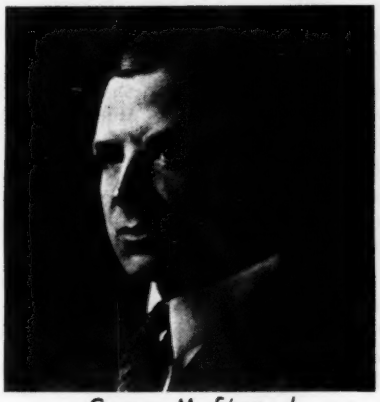
There are those who would shorten the definition and definitely tie the professional status of an engineer to the acquiring of a legal one by registration or license under the respective state or territorial laws. Such definition might read: "An engineer is a man who has been legally qualified to practice the profession by the laws of his state."

Recently in the Bulletin of the Minnesota Federation of Engineering Societies there was reprinted from the Journal of Engineering Education an excellent paper by Dean E. A. Holbrook of the School of Engineering and Mines of the University of Pittsburgh entitled "Teaching the Facts of Professional Engineering Life." He listed two paramount facts relating to the young engineers' professional life, the facts being as follows: First, the professional status of engineers, young or old, under the National Labor Relations Act of 1935; and second, the fact that forty-seven of the forty-eight states, together with all of the territories, require registration of engineers before they may practice the profession of engineering in the particullar state or territory. The following statement is quoted from the opening portion of his address:

"It appears that these two facts are closely related; that they are permanent conditions that will vitally affect this and every future graduate who should be informed on how and where they will help or hinder him in his quest for professional success. If we of the colleges are concerned with preparing men for life, knowledge of these two realities may be of more technical value to them than the details of any single engineering subject, and of more cultural value than any particular nontechnical elective of the undergraduate course."

A New Profession

Engineering, compared to law, medicine or the ministry, is relatively a new profession. Engineering was first employed in military operations in the construction of forts, roads and bridges. To distinguish the man whose profession was that of designing and building



George M. Shepard

Born 1888 Ellington Township, Dodge County, Minnesota. Grade and High School education in public schools of Kenyon, Minnesota, and Shattuck School, Faribault, Minnesota. Graduated 1909 from University of Minnesota with degree of Civil Engineer. Member Tau Beta Pi, Sigma Xi and Grey Friars. Early engineering experience on railroad, municipal and government work. Served in World War I as Captain, 3rd U. S. Engineers, Schofield Barracks, Hawaii.

January 1919 became associated with the late Louis P. Wolff of St. Paul in general municipal engineering practice. December 1922 appointed Chief Engineer of the Department of Public Works, St. Paul, Minnesota, and has served continuously since, except from 1928 to 1931, when he resigned to become chief engineer of a contracting company, and in 1942 and 1943 on leave of absence as consulting engineer for the Federal Works Agency and later in charge of operations on a section of the Alaska Highway.

Charter member of Minnesota Association of Professional Engineers, Chairman of the Minnesota Board of Registration for Architects, Engineers and Land-surveyors, Past President of the Minnesota Federation of Engineering Societies, Past President of the Northwestern Section of the American Society of Civil Engineers, Vice President, Municipal Section of the American Road Builders Association, Chairman of the Committee on Legal Procedure of the National Council of State Boards of Engineering Examiners, Chairman of the American Society of Civil Engineers Committee on Registration of Engineers.

peace time work as contrasted with those employed on military engineering, the term "Civil Engineering" was coined. The early outstanding engineers were in reality practical minded scientists. Through the greater part of the eighteenth century engineering was confined largely to geographic measurements or surveying, and the design and construction of canals, railroads, waterworks, roads and bridges. The industrial revolution in Europe which culminated about the time of our revolutionary war, gave rise to the mechanical engineer. Following this war the new industrial processes resulting from the so-called industrial revolution were transplanted full grown to the United States without the industrial upheaval occasioned on the continent. Civil engineering, architecture, mechanical engineering in its development of the steam engine, textile machinery, etc., as brought from Europe carried substantial backgrounds of accomplishment to this country. The electrical, mining, chemical and aeronautic branches of the profession have received their greatest impetus from inventions and development right here in our own country. The practice of architecture in early times, as well as the structural engineering involved was based to a considerable degree upon precedent.

Early Engineering Schools

Although engineering training had been given in the United States Military Academy from its inception, the first institution in this country to establish a full college curriculum in science and engineering was Rensselaer Polytechnic Institute of Troy, New York, in 1824. It is said to be the first school having a continuous existence to be established in any English speaking country. Since then the many engineering institutes and colleges in both private schools and land grant universities have come into being. These engineering colleges before the war graduated some 14,000 each year.

The first state law requiring registration of engineers and regulating the practice of land surveying was passed by the state of Wyoming in 1907. In 1908 Louisiana passed a similar law covering civil engineers and surveyors. With the exception of Illinois which in 1915 passed a law requiring registration for structural engineers and land surveyors, and Florida which in 1917 passed one requiring registration of engineers, no further laws were passed by the various states until after World War I. The work of engineers during the first war in both military and production activities apparently stimulated the professional consciousness to such an extent that by the end of 1921, the year the original Minnesota registration law was enacted, there were twenty states with such laws.

Now every state in the Union, except Montana, has an engineering registration law. The territories of Hawaii, Alaska and Puerto Rico have similar laws. The Philippine Islands had such a law until the Japanese occupation and will undoubtedly restore it as soon as conditions permit. The District of Columbia does not as yet have a registration law. At the present time there are something over 75,000 registered professional engineers in the United States and its territories. In Minnesota there are 1551 registered engineers, 312 registered architects and 492 registered land surveyors. Of the engineers, 268 or 18%, are non-residents.

The Minnesota law in 1921 was enacted thirty-eight years after the first comprehensive act was passed regulating the practice of medicine in this state. I am advised that as far back as the territorial days before admission of the state in 1857 there was a general act regulating medical practice which held over until the comprehensive act was passed in 1883.

Early Medical Schools

Several years ago Dr. F. J. Savage, prominent St. Paul physician and surgeon, spoke before the district meeting of the Minnesota Association of Professional Engineers. He was asked the question as to what the success of the county and state medical associations in fostering the high professional standard now enjoyed by the medical profession could be attributed. He replied, "It can be attributed to the untiring and unselfish work for fifty or more years of a determined group of medical practitioners throughout the state who had as their aim the accomplishment of improved relations with the public and the betterment of the profession within itself." The same goal can undoubtedly be accomplished by the engineering profession, but it will take many years of the same type of untiring and unselfish work. No more propitious time can be selected by the young engineer than his entrance upon the first step of professional work following graduation.

Minnesota Registration Law

The original 1921 Minnesota law was strengthened by amendment in 1933, and again in 1945. The provisions of the present law compare well with the so-called Model Law set up by the conference of the principal engineering societies, and upon which many of the states have based their legislation. Ample provision is made to give the Board charged with administering the registration law proper powers to examine applicants and enforce the provisions of the law.

The Minnesota law provides for the registration of architects, engineers and land surveyors. Eleven of the states and territories have joint boards for the registration of both engineers and architects. If the experience in Minnesota is any criterion, such a joint board undoubtedly tends toward a greater degree of cooperation between the engineering and architectural professions. Nearly all of the states have a joint board for registering both engineers and surveyors, inasmuch as land surveying is recognized as a limited branch of engineering.

Purposes of Registration

The initial section of our law reads as follows:

"In order ot safeguard life, health, nad property, and to promote, the public welfare, any person in either public or private capacity practicing, or offering to practice, architecture, professional engineering, or land surveying in this State, either as an individual, a co-partner, or as an agent of another, shall be registered as hereinafter provided. It shall be unlawful for any person to practice, or to offer to practice, in this State, architecture, professional engineering, or land surveying, or to solicit or to contract to furnish work within the terms of Sections 326.02 or 326.16, or to use in connection with his name, or to otherwise assume, use or advertise any title or description tending to convey the impression that he is an architect, professional engineer (hereinafter called engineer), or land surveyor, unless such person is qualified by registration under Sections 326.02 to 326.16."

In enacting this law the state places an obligation on the profession. In designating a board of examiners for the purpose of conducting professional examinations and to register or issue public licenses. To those who successfull pass them, the state places the responsibility directly on the profession itself. In other words, the profession must guarantee to the public the trustworthiness of its practitioners. In return the state by registration legislation protects the profession by giving it a privileged position before the law.

History of Registration

The path of registration in many states has been rough and frequently the resulting laws have embodied compromises. The supporters of registration from the first were the rank and file of the engineers, the city and county engineers, employees of highway departments, of small industrial concerns, and many from those engaged in general engineering practice. Some of the national engineering societies, although subsequently staunch supporters of registration, originally were indifferent. Many industrial concerns employing engineering graduates were passive or even opposed to registration. All of this opposition, fanciful or otherwise, seems to have been brushed aside by the conviction of engineers in all capacities that if we as engineers are ever to obtain public recognition, respect and influence, it must be through registration or licensing.

The foregoing statement is made advisedly and is based on my knowledge as a member of the Minnesota Board of Registration which, in spite of the war-time activities of many engineers, has literally been swamped by applications for registration. It appears that the resurgence of interest in professional matters which resulted in the enactment of laws in many of the states following World War I will be greatly exceeded by the present movement following World War II for universal registration of professional engineers.

Who Is Eligible?

There may be some question on your part as to who is eligible for registration and what are the duties and obligations of the Board in connection with examinations? The following is quoted from the law:

"The board shall, on application therefor, on a prescribed form,..... issue a certificate of registration.....;

"(1) To any person over 25 years of age, who is a citizen of the United States or Canada. or who has made declaration of his intention to become a citizen of the United States; who speaks and writes the English language; who is of good moral character and repute, and has been actively engaged for *eight* or more years in *architectural or engineering work*, or engaged for *six* or more years in surveying work. The character of such work shall be *satisfactory* to the Board. Each *schoalstic* year of teaching or of study satisfactorily completed, of architecture, engineering, or *land* surveying in a school *or college* of architecture or engineering *accredited* by the *National Architectural Accrediting Board* or by the *Engineers' Council for Professional Development*, shall be considered as equivalent to one year of such active engagement, *provided, however*, that *three years* of *actual experience* of a *standard satisfactory to the board shall be required in addition to school attendance.*

"An honorably discharged veteran of World War I or World War II shall be given credit for such experience or education gained in the armed services of the United States as meets the standards fixed by the board.

"(2) To any person who holds a like unexpired certificate of registration issued to him by proper authority in the District of Columbia, in any state or territory of the United States, or in any province of Canada, in which the requirements for registration of architects, engineers, or land surveyors are equal to those fixed by the board and by the laws of this state, and in which similar privileges are extended to the holders of certificates of registration issued by this state;

Subd. 2. *Examination.* The board may subject any applicant to such examinations as may be deemed necessary to establish his qualifications.

"Subd. 3. *Rules for classification.* The board may make reasonable rules and regulations for classifying and registering engineers in divisions according to their qualifications to practice different classes of engineering work, and shall, in such case, register qualified applicants in one or more such divisions in which they shall qualify under the terms of Sections 326.02 to 326.16 and shall, in any event, provide one such division for highway engineers."

Eight Years Requirement

The requirement for eight years of engineering work including years spent in acquiring college education meets the requirements of the Model Law. The same period of eight years is required for registration in the great majority of the states. With the present four year courses leading to the bachelor's degree, an addition four years of engineering work, and with the liberalizing of the technical courses to five years as recently proposed, an additional three years of engineering work would be required. It is generally conceded that a seasoning period is required after graduation whereby young engineers may for a relatively short time under mature direction, but with still some degree of responsibility, learn to apply their talents and scientific attainments to the professional practice of engineering. This seasoning period is accomplished by the eight year requirement.

Responsibility of Boards

Registration boards have a large responsibility to the public. When by registration they admit a man to practice, they in fact certify to the public that this man is capable of safely, efficiently and economically performing the function implied by the title which he is permitted to assume. Examinations, whether written or oral, must be comprehensive but unquestionably fair. Not all who profess to be engineers are entitled to that distinction. The following statement of responses prepared by Dr. D. B. Steinman from records of interviews given by the New York Board to applicants for registration could well appear in "Believe It Or Not" and also furnish an illuminating answer to the larger question —"Why Register Engineers?"

"Boner" Answers of Applicants

A. This candidate claimed extensive experience in structural design.

Question: What do you mean by the bending moment in a beam?

Answer: It is the *moment* when the beam bends.

(The examiner was not sure he had heard correctly.)

Question: Do you mean the *instant* when the beam begins to bend?

Answer: Yes, sir—the instant when the beam begins to bend.

B. This candidate claimed extensive education through home study and private tutoring.

Question: How far did you get in your study of mathematics?

Answer: Through calculus.

Question: What is the tangent of 45 deg.?

Answer: It is a line drawn on a circle.

Question: What is the sine of an angle of 30 deg.?

Answer: I do not know.

Question: What do you mean by the sine of an angle?

Answer: It means whether it is plus or minus.

C. This candidate, without engineering education, styled himself an "amusement engineer" and claimed to be the leading expert on the design of roller coasters. He has "designed" the huge roller coasters at some of the principal amusement resorts and for large fairs and expositions.

Question: How do you calculate the stresses in the structure?

Answer: I know, from experience, how large to make all the pieces.

Question: What calculations do you make?

Answer: I have a formula in my office for the force of a car going over a curve.

Question: Do you employ any other formulas?

Answer: No, sir. That is the only one I need.

Question: What factor of safety do you use?

Answer: About 90 per cent.

Q. Do you mean that your factor of safety is less than unity?

Answer: Yes, sir. Less than unity.

Question: Why do you do that?

Answer: To give the customers a bigger thrill. They have to hold on when they go over a curve.

Question: Isn't that rather dangerous?

Answer: No. When a car is going fast, you don't need a hundred per cent safety. You get across before anything happens.

Question: Why do you not employ an engineer to do the designing for you?

Answer: I get only $10,000 for a design and, if I employed an engineer, I would have to give half of it to him.

Prosecution for Violators

The board of registration has full authority to prosecute violations of the law and to revoke or suspend registration certificates were conditions warrant and the legal procedure as outlined in the law is to notice, hearings, etc., is followed. Our board employs the part time services of an attorney who is deputized as a special assistant in the attorney general's office for the purpose of investigating complaints and prosecuting cases where action is authorized by the board.

Of perhaps greater importance than legal enforcement to the integrity of a profession is the application of ethical principles to professional engineering practice. An applicant for registration in Minnesota must subscribe to the code of ethics, which is a part of our official rules, and must submit such signed copy with his application. Of far greater effect than legal action is the influence upon the individual of pressure from "ethical practice" committees of our engineering societies. I refer particularly to the excellent work done by this committee of the Minnesota Association of Professional Engineers.

In order to vitalize the critical but neglected period, namely, the seasoning or experience period for the young engineer between graduation and registration, several states, of which Minnesota is one, have instituted Engineer in Training examinations. This provision was one of the constructive amendments made in the 1945 law and reads as follows:

"Any candidate for registration as an architect or professional engineer who is a graduate of an accredited school or college of architecture or engineering or who has had four years or more of experience in architectural or engineering work of a character satisfactory to the board shall receive from the board, upon successfully passing an examination in fundamental architectural or engineering subjects, a certificate stating that he has passed such examination and his name has been restored as an architect-in-training or as an engineer-in-training."

Engineers-In-Training

From the practical viewpoint this section of the law permits the taking of an examination in fundamental mathematics and the sciences, and in the application of these to engineering problems while the subjects are still fresh in mind.

This examination must definitely be confined to what has been acquired in the engineering school or college. The successful passage of the Engineer-in-Training examination will assure the young engineer that he will not be required to again take an examination in fundamentals for final registration.

Having passed this examination the young man, if he follows engineering, will secure some type of employment in engineering work. In preparing himself for later registration he may inquire as to the type of engineering work which will satisfactorily meet the requirements of the board. These requirements are not difficult to meet. With few excepitons in normal times young engineers must start in subordinate positions acting as field men, designers, detailers, inspectors, junior engineers in industrial works, and in some cases pass through industrial training courses. In all of these cases when the board in later years interviews or examines these same men when applying for registration, the question asked will not be "how important a job did you have?" but "what advancement did you make during these years in your capability for assuming increased responsibilities in the practicing of your chosen profession?" It goes without saying that a graduate who had not followed engineering or one whose duties had been only indirectly related to engineering work would have difficulty in meeting the requirements of satisfactory experience.

Examination Helps Trainees

These Engineering in Training examinations with the accompanying insight into professional objectives will tend to clarify and direct the activities of the graduate. Examining boards can aid in giving helpful information and suggestions to those admitted to training. Engineering teachers may obtain an immediate and practical appraisal of their graduates. Contacts between educators and examiners can not help but lead to mutual understanding and better coordination between the educational and professional development of the engineer.

With the institution of the Engineer in Training period, I believe there has come to the engineering societies and to the industries and other agencies employing engineers a new realization of the importance of this seasoning or experience period in the development of those who are to be their leaders later on.

Col. Walter E. Simpson Honored

Word has been received that Col. Walter E. Simpson, one of the Past Presidents of the National Society of Professional Engineers, has been detailed to the House of Representatives Military Affairs Committee, for an indefinite period.

What's Good For Whom?

There are two strongly contrasting points or view with regard what ought to be the government's legislative and economic policy. One point of view is expressed in the familiar slogan: "What's good for business is good for you." The other is now being advanced by the Washington office of the "New Council of American Business, Inc.," which reads: "What's good for the American people ought to be good enough for American business."

The power in the hands of statesmen (or politicians) that is conferred by their authority to order the use of the atomic bomb is on a different plane and order of magnitude than the human race has ever known. Unless we are able to "marry reason to authority," we may end up by depriving ordinary people of any claim to security or happiness that is likely to achieve fulfillment.

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Kindly report any errors or omissions to the Editor.

National and State Society News

Fifth Regional Conference Meets in Philadelphia

The 1946 Regional Conference of Eastern State Societies of Professional Engineers, held in Philadelphia on May 2nd, turned out to be a "really swell party." There were 180 present for the meeting and 134 for the banquet in the evening.

With but one exception, all Pennsylvania Chapters were represented, and all Chapters from New Jersey except two.

Special guests for the day included President Ritchie Lawrie, Jr., of the NSPE and D. Robert Yarnall, President, The American Society of Mechanical Engineers.

President Ritchie Lawrie, Jr., pointed the way to greater attainments for Professional Engineers, as did William Larkin, Chairman, Publications Committee, of NSPE., and Earle Dailey, Chairman, Eastern Zone Membership Committee.

The New officers installed by Pennsylvania's State President LeRoy F. Christman, in addition to President Costello, were: Vice-Presidents, Gerhard J. Lauter, and George E. Hesselbacher; Secretary, H. E. Corl; Treasurer, George Cook, Jr., Directors, Allan H. Kidder and Thomas F. Kerney.

Daniel Kramer, President of the New Jersey Society of Professional Engineers, extended an invitation for the 1947 Regional Conference to be held in New Jersey.

The meeting was presided over by Ray M. Fuller.

Dr. Karl T. Compton Speaks at ESNE Annual Meeting

The annual meeting and dinner of the Engineering Societies of New England on April 23rd, at the Boston City Club was high-lighted by the principal address by Dr. Karl T. Compton. Dr. Compton, President of the Massachusetts Institute of Technology, speaking on the subject: "Atomic Energy; Was the bomb justified? The outlook on legislation, and Future Developments."

Dr. Compton holds a unique place in American science, not alone because of his distinguished contributions as a physicist, but as an educator, administrator and humanitarian.

He is convinced that education in science and engineering, combined with fundamental studies in the social implications of their professions, is the best preparation for the advancements of civilization. His belief that municipal, state and national governments offer technically trained men broad opportunities for raising the standards of public service is indicated by his own generous contribution of time to public activities. As chairman of the Science Advisory Board, appointed by President Roosevelt in 1933 to consider the relation of science to the activities of the Federal Government, he directed inquiries into problems of national importance.

Throughout the trying period of economic instability beginning in 1929, Dr. Compton constantly directed attention to the many avenues in which science offers definite promise of raising the standards of public service. Under his guidance, the Institute has made notable contributions through education and research to the advancement of public welfare.

Research of the future, Dr. Compton believes, must concern not only new discoveries, but the development of new industries based upon the work of scientists and engineers. In this field he sees prospects for new products, and hope for increased employment.

Under his administration, the George Eastman Laboratories of Physics and Chemistry were completed and stand today not only as a center, but as a symbol of a fruitful union between pure and applied science. By effective interpretation of his ideals and objectives of science he has helped to establish higher goals and new faith in the power of science to do good, not alone at his own Institute, but in the world of science in general.

The Emergency Fund

According to a tabulation prepared by the Washington Headquarters Office of the Society, the total contributions to the Emergency Fund, as of May 5th amount to $6,936.50.

Recently very encouraging letters in reference to the Fund were received from the following Professional Engineers:

Walter A. Shaw, 30 N. LaSalle Street, Chicago, Ill.

Donald Cockburn, 15 Irving Street, Melrose 76, Mass.

J. Harvie, 1317 Arcade Bldg., St. Louis 1, Mo.

Pan-American Sanitary Engineers Plan Regional Conference

The PAN AMERICAN SANITARY BUREAU in cooperation with the INSTITUTE OF INTER-AMERICAN AFFAIRS is planning to inaugurate the first regional conference on sanitary engineering in Latin America. This conference was scheduled to be held in Rio de Janeiro, Brazil, the week of June 10, 1946. It is planned that Sanitary Engineers from Argentina, Bolivia, Brazil, Chile, Paraguay, Peru, Uruguay and the United States of America will participate in the conference. The objectives of the conference are:

1. Advancement of the profession of sanitary engineering.
2. Exchange of scientific data and ideas in the development of sanitary engineering in the Americas.
3. To promote the development of standards for sanitation in regard to international travel.
4. Accelerate the development of sanitation in the Americas to aid in the economic development.
5. To create a better understanding between the engineers of the American Republics.
6. To organize a permanent Pan American organization of sanitary engineers.

The Department of Health of the Ministry of Health and Education of Brazil acted as host to this conference and conference sessions took place in the Ministry of Health and Education Building, Rio de Janeiro.

Registration took place on Monday, June 10 and formal opening of the conference sessions taking place at 11 a.m. that day.

All sanitary engineers; civil engineers engaged in sanitary, water supply, or hydraulic projects; public health administrators; federal, state, or municipal sanitary engineers; engineering educators and engineering students were cordially invited to participate.

Further conference information and hotel reservations in Rio de Janeiro

may be secured by writing directly to Mr. Edmund G. Wagner, Institute of Inter-American Affairs, Avenida Rio Branco, 251 Caixa Postal 1530, Rio de Janeiro, Brazil.

Coming Events to be Remembered

Oct. 27, AM., NSPE Board of Directors Meeting, St. Louis, Mo.

Oct. 27, PM. Joint Meeting of the ASPE and the NCSBEE Boards of Directors, St. Louis, Mo.

Oct. 28, AM., NSPE Board of Directors Meeting, St. Louis, Mo.

Dec. 6, NSPE Board of Directors Meeting, Atlanta-Biltmore Hotel, Atlanta, Ga.

Dec. 6, Third Annual Meeting, Georgia Society of Professional Engineers, Atlanta-Biltmore Hotel, Atlanta, Ga.

Dec. 7, NSPE Annual Meeting, Atlanta-Biltmore Hotel, Atlanta, Ga.

Please keep the Editor informed well in advance of all meetings or other Society events having news value at the National level. We especially want to be supplied with information as to the speaking engagements of all National Officers, including National Directors. Our readers can contribute greatly to improving the variety and interest value of the material in the American Engineer by sending us copies of addresses by any speaker on topics dealing with the social-economic problems, and any other material relating to the objectives of the National Society of Professional Engineers.

This material should reach us not later than the 10th of the month previous to date of the issue in which publication is to occur.

Engineering and Scientific Positions Open in The Navy

The United States Navy Department now issues a Monthly Bulletin which lists the various scientific and technical positions to be filled in its Departmental and Field Services. Those interested may address: Personnel Management Branch, Scientific Personnel Division, Office of Research and Inventions, Washington 25, D.C. Ask for a copy of the latest monthly issue of the "Monthly Bulletin, of Scientific and Technical Positions in the Departmental and Field Service of the Navy Department."

The April issue listed various positions open in the following departments: Hydromechanical, Aeromechanics, Structural Mechanics, Electronic Section and the Technical Service Section.

Starting salaries range all the way from $1440 to $8750, with many positions available within the starting salaries range of $3,600 to $6,230.

The Optimist: "Soon we shall all be begging for money."

The Pessimist: "From whom?"

An Optimist is one who thinks this is the best of all possible worlds. The Pessimist is one who agrees with the Pessimist.

Show Your Colors

One of our Members writes to ask why it is that so few of the N.S.P.E. Members are wearing the pin of the Society. That is really a hard one to answer. One would think that a Member of the world's greatest engineering Society would be so proud of his affiliation that he would advertise it in every legitimate way. But one of the failings of most engineers seems to be that they are too modest. That is part of the reason the public forgets the engineer until they need his help.

Did you ever go into a doctor's or a lawyer's office that was not decorated with his license and diploma — maybe two or three diplomas? Is it any more undignified for an engineer to wear the pin of his Society, and decorate his office with his license and diploma than for the M.D. to do so? Of course not! Show your colors. Let the world know that you are a legally qualified Professional Engineer, and proud of it! Get the diploma of your Society Membership, have it framed, and hang it in your office where all callers will see it. Hang your license beside it. Wear your Society pin habitually. — From a Bulletin sent out to members by the Kansas Society of Professional Engineers.

Mr. Fairman Talks to Austin Company Executives

On May 10th Mr. James F. Fairman, a Vice-President of NSPE., addressed a meeting of executives of the Austin Company, Cleveland at their meeting at the Ambassador Hotel, New York City. He spoke on the objectives of the National Society of Professional Engineers and its program for the achievement of the social and economic advancement of Professional Engineers.

Vice-President Thrailkill An Active Speaker

William L. Thrailkill addressed a meeting of students at Washington State College on May 17th. On May 18th he delivered a talk before a meeting of the Idaho Society of Engineers. He reports that Professional Engineers in the Western Country are rapidly becoming aware of the need for an overall, strictly Professional organization of Engineers.

DISTRICT OF COLUMBIA

President Fred W. L. Hill reported on the National Presidents' Conference at Columbus, Ohio, at the regular monthly meeting of the D.C. SPE, April 22nd. Mr. Hill had a great deal to report on the "Second Mile" in the March of Progress of the Society.

Arrangements were successful for our annual stag dinner held on May 27th. This was held at the Continental Hotel. We were happy to have as a guest speaker, Engineer-Commissioner of the District, Brig. Gen. Gordon R. Young. In addition to Gen. Young, the Presidents of the Local Chapters of the various Technical Societies were our guests.

A Washington Engineers' Club

For many years, and especially during the War, there has been an increasing demand for a club here in the National Capital where engineers could gather. Undoubtedly you also, have realized this need for closer professional contacts.

Several local societies, affiliated with the District of Columbia Council of Engineering and Architectural Societies, have urged that a club be formed for engineers.

About the first of this year Mr. F. A. Leser was designated to call together an Organizing Committee of all local societies especially those not affliated with Council. This committee elected the following temporary officers: Mr. F. A. Leser, chairman; Commander S. L. Gregg, secretary.

Subcommittees are actively working on:

1. Constitution and By-laws.

2. Nominations for officers.
3. Luncheon meetings monthly with outstanding speakers.
4. Collecting information about engineers clubs in other cities.
5. Planning quarters for the club.

Just as soon as this preliminary work can be completed you will be given more difinite information and invited to become a *charter member*.

Whereas the ultimate goal is to have a club complete in every detail, we must, by necessity, start in a modest way. It should be kept in mind that the quarters for the club and its activities will depend, very greatly, upon the financial support by members.

ILLINOIS

President George Anderson is organizing a new membership drive, which will work mainly through the chapters. Each chapter obtained lists of engineers in their territory. These lists were prepared from the applications made for registrations two years ago and are being brought up to date from various sources. The chapters have also available several new publications. The pamphlet on the aims and activity of the Illinois Society of Professional Engineers has been published in a revised form. The new constitution and also the schedule of minimum fees and salaries are now available in printed form. Copies of the Illinois Professional Engineering Act can also be obtained. With all this material put at disposition of the chapter by the State Society it is hoped that the present steady growth in membership can not only be maintained, but will be accelerated greatly.

KANSAS

The presidents of four Kansas Engineering Societies, together with their Legislative Committees got together recently and formed the "Kansas Engineering Council." The new organization is not another engineering society. It has no members, its only purpose being to carry out the wishes of the parent societies, which are: The Kansas Engineering Society, the Association of County Engineers, the American Society of Civil Engineers, and the Kansas Society of Professional Engineers.

The idea behind the move is the thought that all these organizations, working through a central committee would accomplish more with less effort than by each Society or legislative committee working independently. The President, Vice-President and Secretary-Treasurer, are all members of the KSPE.

A tentative draft of an engineer licensing law has been prepared by the secretary of the KSPE, which is to be the basis for further study and development.

Harry Marshall, a charter member of KSPE, has been elected vice president of the Topeka Safety Council. He is very active in selling professionalism to engineers at every opportunity.

The membership of the KSPE has made a 21% gain since the first of the year.

MINNESOTA

As a result of a letter written by Mr. S. L. Stolte, the Engineering Society of St. Paul has appointed a committee to which has been delegated the task of reporting on "How to Raise Engineering Standards."

The Engineers' Club of Minneapolis, described as "the largest businessmen's club in the Twin Cities," has a "Toastmasters' Unit." This looks like an idea that many Professional Engineering Societies might well act on. Engineers are notoriously in need of improving their ability to speak in public.

NEW YORK

The Niagara and Chattaraugus-Chautauqua Chapters, met with the Erie County Chapter in a meeting on April 22nd, at the University Club, Buffalo. Following a dinner at 6:30 p.m., Mr. Harry R. Tower, of the Standard Oil Company, spoke on "The Significance of Petroleum, from Crude Oil to the Finished Product." Mr. Tower is supervisor of Technical Training, for the Division of Socony-Vacuum Oil Company, at New York City.

The New York State Society of Professional Engineers is working on a rather interesting publicity idea for Professional Engineers. An attempt is being made to obtain automobile license plates bearing the initials "PE." The plan is patterned after the "MD" license plates which have been used by physicians.

At a recent meeting of the State Executive Board, the State Executive Committee was authorized and did appoint a committee to "Study the question of honorary membership in the State Society, and to present a report at the Annual Meeting."

A regular dinner meeting of the Nassau County Chapter, New York State Society of Professional Engineers was held at Felices Restaurant, Old County Road, Westbury, L. I. Wednesday night, April 10th.

A. A. Bearman, program chairman arranged an unusually interesting movie program following the dinner and business portion of the meeting. This program included several reels covering features of the Atomic Bomb, also bridge, road and airfield construction performed by the U. S. Army Engineers in the China-Burma-India Theatre.

Professional Engineers & Land Surveyors not members of the Chapter attended.

National Vice-President James F. Fairman, was the principal speaker at an April 30th meeting of the Lynn Section, American Institute of Electrical Engineers. His subject was: "Organization of the Engineering Profession." Mr. Fairman is the Chairman of the National A.I.E.E. Committee on Planning and Coordination.

New York Society Holds 19th Annual Convention

The 19th Annual Convention of the New York State Society of Professional Engineers was held at the Hotel New Yorker, New York City, on May 3 and 4. The first state-wide meeting of the Society since the removal of war-time travel restrictions, it attracted an unusually large and representative attendance. All general and committee sessions drew large audiences which actively participated in the discussions.

Following their regular meeting on Friday afternoon, 50 members of the Executive Board were present at a dinner which preceded the open smoker in the evening. Over 600 engineers and guests attended the latter affair, where refreshments were "on the house" and entertainment was provided by some of Broadway's leading talent.

A general membership meeting occupied the whole of Saturday, interrupted only by the annual reception and luncheon which is a feature of each convention. This was attended by approximately 250 members and guests as well as many prominent officers of national engineering societies and local civil governments.

The toastmaster was William H. Larkin, vice president of NYSSPE and chairman of the publications committee of NSPE. In the unavoidable absence of both Mayor William O'Dwyer and Deputy Mayor George E. Spargo (a member of Queens County Chapter), the address of welcome to the city was made by Dr. John C.

Riedel, chief engineer of the Board of Estimate, a member of Kings County Chapter and chairman of the engineers-in-training committee.

Ritchie Lawrie, Jr., President of NSPE presented a framed copy of a resolution expressing the appreciation of the membership of the National Society to Dr. Arthur V. Sheridan, in recognition of his outstanding work as editor of the American Engineer and for his varied work on behalf of the advancement of the profession of engineering.

Mr. Lawrie also presented State scrolls to the following former presidents of the NYSSPE: James M. Welsch; Dr. Arthur V. Sheridan; Dr. David B. Steinman; Dr. John C. Riedel; Alfred E. Roche; Frederick H. Zurmuhlen; James F. Fairman; and Clarence W. Post.

The principal speaker was Sidney D. Kirkpatrick, editor of "Chemical and Metallurgical Engineering," and former president of the American Institute of Chemical Engineers and of the Electrochemical Society, Inc. His subject was: "Prospects of Unity in the Engineering Profession." Mr. Kirkpatrick gave his listeners many thought-provoking ideas of undoubted future value to Professional Engineering organizations.

N. Y. State Board of Engineering Examiners Meet

The 261st meeting of the N. Y. State Board of Examiners of Professional Engineers was held in New York City on April 24, 1946.

Of a total of 232 applications considered at this meeting, 12 were held for further consideration, 21 were scheduled for preliminary examinations, 86 were scheduled for final examinations, 12 were rejected, 45 were certified as having passed the preliminary examinations, and 56 were approved for license.

The Queens County Professional Engineers presented scrolls to their past Presidents, J. Franklin Perrine, Andrew K. Johnson, George H. Burns, Martin Nelson and William C. Kochendoerffer, in recognition of the service performed during their terms of office, at 8:00 P.M. on Thursday evening, May 23rd, at the Jamaica Y. W. C. A. Building, 87-80 153rd Street, amaica, N. Y.

The 45 new additions make a total to date of 228 candidates who have passed the preliminary examinations and have been certified as Engineers-in-Training in New York State.

With the resignation of Roy G. Finch (Albany), secretary, and Irving Peck (Binghamton), the present personnel of the Board is as follows: D. B. Steinman (New York City), Chairman, Newell L. Nussbaumer (Buffalo), Vice Chairman, Newell L. Freeman (Schenectady), Secretary, Erich Hausmann (Brooklyn). (One vacancy to be filled).

Lieutenant Commander Walter P. Warendorff, a member and former first Vice President of the Queens New York State Society of Professional Engineers, has been named Chief of the Technical Section of the New York State Veterans Administration. He will be in charge of the architectural and engineering design work for Veterans hospitals and facilities in the State of New York and in Puerto Rico. In addition, he will advise on technical matters in the Regional, Sub Regional and Contact offices in New York State.

Commander Warendorff, who was educated as a Civil Engineer at Rensselaer Polytechnic Institute, was formerly a consulting engineer in New York City. Just previous to entering the Navy, he was on the staff of General Somervell, as civilian in charge of construction authorization of port and storage depot facilities. Besides his service with the Navy during World War II, Commander Warendorff was an officer in the Army Corps of Engineers and is a veteran of the Old Seventh Regiment of New York. He is active in the Brooklyn Engineers Club and in 1941 was made a Fellow of this organization.

OHIO

At the May meeting of the Dayton Chapter, the first of its kind to be held by that Chapter, certificates of Registration as Professional Engineers were presented to applicants from fifteen counties. President A. C. Neff, of the Ohio Society of Professional Engineers, was a speaker.

Membership of the Dayton Chapter has increased during the past 12 months from 133 to 193 members. New registrants eligible for membership should swell this total considerably.

The Dayton Chapter is planning a big picnic for members and their friends to be held late in June.

OKLAHOMA

The directors and committee chairmen of the Oklahoma Society of Professional Engineers held a very successful meeting at the Huckins Hotel Saturday afternoon, April 13th. Among the important matters agreed on were the following:

1. The employment of a full time secretary and the maintenance of a state headquarters office.
2. Assistance by the secretary to the officers of the Society in the performance of their duties and to state and district committees in the conduct of their meetings.
3. Assistance to governing bodies in the apprehension of violations and in the enforcement of the Registration Law.
4. Dissemination of information to all members concerning pending legislation that might affect the welfare of the engineering profession.
5. Publication of a monthly magazine devoted to items of interest to Oklahoma engineers including a listing of engineering positions open within the state, a listing of professional engineers who are available, notices of all meetings of engineers and technical societies within the state, a listing of current construction programs of various divisions of the government and a resume of pending legislation affecting the interest of professional engineers.

The attainment of these objectives is in the interest of every professional engineer. Other goals will be added as the need arises. The Society has voted overwhelmingly for an increase of dues to $10 in order that these things may be realized.

PENNSYLVANIA

Engineers of the Pittsburgh Chapter and their Ladies were invited to a "Ladies Night" meeting at Martin's Ferry, Ohio, on April 25th, sponsored by the East Ohio Chapter of O.S.P.E.

The Executive Secretary of the Pennsylvania Society of Professional Engineers reports that the Pittsburgh Chapter Director has been present at all seven State Society meetings during 1945. The Pittsburgh Chapter stands alone with this record and wishes the world to know that no proxies were used to achieve this record. It is a record to be proud of.

The increased activities of the Society in 1947 will require an increase in State Dues of $2.00 per member, making the total $6.00 per member.

The budget committee recommends this increase in dues.

Pittsburgh Professional Engineers have often stressed the role of the engineer in disease prevention, for which he receives little or no popular credit. An excellent example of the Engineer's part in disease prevention is the reduction of the typhoid fever cases in Pittsburgh since the water filtration plant (an engineering work) was put in operation. In 1906 the number of typhoid and paratyphoid cases in the City of Pittsburgh was 6,582; in 1909, 755.

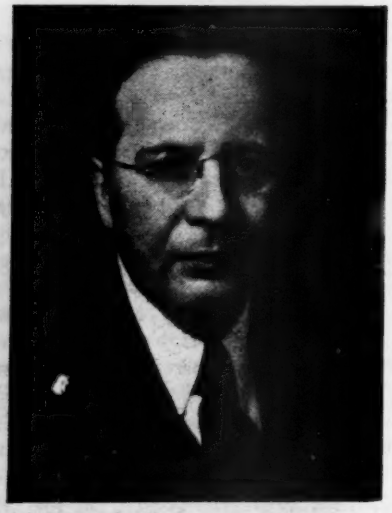
Since 1922 there has not been a single year in which this mostly waterborne disease numbered 100 cases.

In 1944 there were nine and in 1945 ten. Yet in spite of this and many similar records, we were told by a doctor recently that there are only 10 engineers employed by public health agencies in the whole state of Pennsylvania.

The Executive Board of the State Society met in Philadelphia on May 2nd. Engr. Robert C. Coblentz represented the Erie Chapter at this meeting and in the evening attended the Regional Conference held by the Philadelphia Chapter at the Engineers Club. National Society President Ritchie Lawrie, Jr., was the main speaker and members from the New York, Connecticut, Massachusetts, New Jersey, Maryland, Indiana and District of Columbia Societies were present.

RHODE ISLAND

Dr. D. B. Steinman Addresses Joint Rhode Island Meeting



The May 17th meeting of the Rhode Island Society of Profesional Engineers was held jointly with the Providence Section of the American Society of Civil Engineers.

An address entitled, "BUILDERS OF THE BRIDGE," was delivered by David B. Steinman. It was a dramatic presentation of the lives of the Roeblings and the building of Brooklyn Bridge, illustrated with slides and radio transcription.

TEXAS

The Executive Board of the Texas Society of Professional Engineers has adopted the following program for the State Society:

1. To sell the Society to members and to all registered engineers through a concrete definition of an engineer.
2. To inaugurate definite plans which will acquaint our members with the members of the State Legislature.
3. To support actively the constitutional amendment which will make possible a retirement plan for State and County employees.
4. To support vigorously the Registration Act in order to minimize violations.
5. To encourage adequate compensation and recognition of engineers by bringing the Schedule of Minimum Engineering Fees and Salaries up to date and by distributing these schedules to the State, County and City officials employing engineers, and to all consulting engineers.
6. To study the Registration Act to determine what amendments are desirable and to prepare amended sections for submission to the next legislature.
7. To conduct actively a membership campaign having a goal of 1800 members for TSPE for 1946.

The number of members of TSPE in good standing as of March 25, 1946 was 1,305, as compared with 1,159 on November 23rd, 1945.

A March 30th report on the status of the State Society's Secretary Fund, shows a total of $14,779.00 pledged, against a total quota of $22,500..00.

President James P. Exum, of the Texas Society of Professional Engineers presented the newly organized Brazos Chapter with its Charter at a meeting in February. J. Neils Thompson, chairman of the State Membership Committee, and Trigg Twitchell, second vice-president of the State Society, both gave brief talks on the importance of the Society's functions in advancing the social and economic status of the Professional Engineer.

WEST VIRGINIA

The West Virginia Section of the American Society of Civil Engineers held a joint meeting with the West Virginia Society of Profesional Engineers on May 24th. The meeting was at the Kanawha Hotel, Charleston. After a 6:30 dinner, Ezra B. Whitman, of Whitman, Requardt and Associates, Baltimore, Md., spoke on the problems faced by his firm of engineers on the Kanawha County Airport. Mr. Whitman is past president of the American Society of Civil Engineers and at one time was road commissioner for the state of Maryland.

During the afternoon preceding the meeting, the engineers were conducted on a tour of inspection of the Kanawha County Airport, by its Director, Fred Alley.

James W. Parker, president, The Detroit Edison Company, spoke at a joint meeting of the Charleston Chapter of W. Va. P. E., and the West Virginia Section of ASME, at Charleston on April 17th. Mr. Parker declared that organizations of professional men can exert great influence in community affairs, when they undertake systematically to keep their membership reliably informed of important municipal developments currently in progress. He pointed out that the Detroit Engineers, through the medium of a "Public Affairs Committee," have been able to render service of great value to the citizens of Detroit.

Mechanics for Engineers by Correspondence Study

The Extension Division of the University of Wisconsin, Madison, through its department of civil and structural engineering, is now offering two revised correspondence-study courses in mechanics for engineers, mainly for qualified students not currently attending schools of engineering. The aim of each is to afford a preparation in the principles of the subject and in their application to engineering problems. The courses are Mechanics 1a (statics) and Mechanics 2 (dynamics). Each embodies 24 assignments and allows three credits toward a degree in any branch of engineering. These credits are accepted by most institutions of higher learning. The instruction is based on a textbook written by three engineering educators at the University of Wisconsin.

Ohio Court Enjoins Unlicensed Firm From Offering "Engineering" Services

The Ohio Society of Professional Engineers deserves great credit for its energy and courage in pushing legal action against an unlicensed concern which for ten years had been offering its "engineering" services to the community.

On October 19th, 1945, suit was instituted against the "Designers for Industry, Inc., 11 of its officers and employees, located at 2915 Detroit Avenue, N.W. The court was asked to grant a temporary order and for a permanent injunction enjoining the Defendants, their agents, employees and associates, and each of them from practicing or offering to practice engineering within the State of Ohio, or using the word "engineer" or any word of like import unless and until such Defendant be legally registered by the Ohio State Board of Registration for Professional Engineers and Surveyors . . .

The success of this test case is indicated by the following paragraphs taken from the decision handed down by the Judge of the Court of Common Pleas:

IT IS THEREFORE ORDERED, ADJUDGED AND DECREED COUNCIL FOR PLAINTIFF AND for the Defendants, Designers For Industry, Inc., Charles H. Standish, John B. Barry, Lawrence E. Blazey, Lee B. Green, George A. Klavon, George C. Lovell, Ben M. Sternberg and Harrison R. Tucker, being present:

1. That the defendant, Designers For Industry, Inc., be, and it hereby is, perpetually enjoined from doing any of the following, either directly or indirectly, through itself, its officers, directors, agents, or employees:

(a) Causing or authorizing any officer, director, agent, or employee who is not a registered professional engineer under the laws of Ohio to practice or offer to practice engineering within the State of Ohio, provided that this decree shall not be deemed to prohibit or enjoin work by unregistered individuals under the supervision of a registered professional engineer.

(b) Adopting, using, or publishing, in connection with or in reference to any officer, director, agent, or employee who is not a registered professional engineer under the Laws of Ohio, any title including the word "engineer" or words of like import.

(c) Advertising any Registered Professional Engineer employed by or associated with said defendant, Designers For Industry, Inc., in any manner which would constitute misconduct in the practice of professional engineering.

2. That each of the defendants, Charles H. Standish, John B. Barry, Lawrence E. Blazey, Lee B. Green, George A. Klavon, George C. Lovell, Ben M. Sternberg, and Harrison R. Tucker, be and he is hereby perpetually enjoined from practicing or offering to practice engineering in the State of Ohio, or using the word "engineer" or any word of like import in connection with or in reference to himself unless and until he becomes registered by the Ohio State Board of Registration For Engineers and Surveyors.

3. That the defendants be required to pay the costs in this case.

Stanley L. Orr
JUDGE

What's New For Engineers

Requests for further information concerning any item mentioned under this heading will be promptly referred to the manufacturer. It would be appreciated if inquiries be addressed on professional or company letterhead.

Send Inquiries Direct to American Engineer, #6 Church Street, New York, N. Y.

NEW GEAR-TYPE HYDRAULIC PUMP

A new gear-type hydraulic pump is announced. The manufacturer states that up to 2000 p.s.i. with 5½ G.P.M. at 2800 R.P.M. Volumetric efficiency using S.A.E. No. 10 oil is above 90%, Overall efficiency above 500 P.S.I. is 85% or better. Production of the pump in large quantities makes it available at low cost to users, according to the manufacturer. It is suitable for hydraulic systems ranging from 100 to 2000 p.s.i., such as farm tractor equipment actuation and control, hydraulic presses, machine tool feed controls, hydraulic jacks, bulldozer blade control, road machinery control, and other uses. Simplified construction and high efficiency are claimed for the pump, which employs Nitralloy gears in C.I. body of "sandwich" type design. It provides ample porting to standard pipe sizes, and mounting flange adaptable to users' equipment. It is said to surpass standard durability and performance tests for its type.

For further information address American Engineer, reference No. 491.

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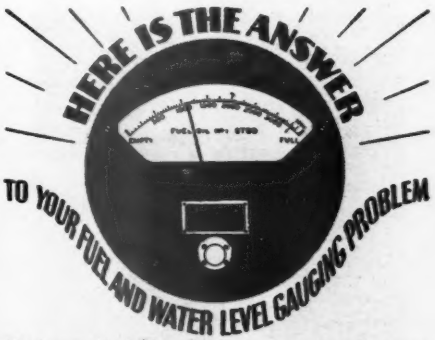
NEW 3-WAY VALVE

A new solenoid-controlled 3-way valve for compressed air is announced. It incorporates the "Fluid Lever" principle of 4-way solenoid valves recently developed and released by this company. Compact, full ported, poppet type, it provides straight line air flow control with few working parts and very little mechanical action. The manufacturer states that the solenoid draws less than 3 amperes on 110 volt 60 cycle current. The short travel of the plunger—a maximum of only 7/64 inches—along with the simplicity of the mechanism tend to eliminate pounding and harsh action, with the result that long life under severe operating conditions is assured. The exhaust port is one pipe-size larger than the supply and outlet, thereby providing rapid dissipation of the exhaust air. The user can select the setup desired by simply reversing the supply and outlet manifolds on the center body—making it open to exhaust and closed pressure, or open to pressure and closed to exhaust, with the solenoid energized or de-energized. Valve can be mounted in any position.

For further information address American Engineer, reference No. 492.



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ALL-BRONZE GEAR PUMP

A new all-bronze gear pump, which can be used for pumping water, oils, solvents, salt solutions, chemicals and other liquids of corrosive or non-corrosive nature, which do not affect bronze, is announced. They are machined to close tolerances with precise gear construction for high performance efficiency. They have bronze housing, bronze gears, stainless steel shaft, 3 Oilite bearings, built-in pressure relief valve and have an Alemite fitting for lubricating the gear shafts. They have a maximum pressure, the manufacturer states, of 300 PSI; at 1750 RPM, Volume is 6 GPM. Discharge is ½". The pumps can be operated by pulley or direct drive and can be mounted internally or externally in a variety of positions. They are available as a pump only; a pump and motor or as a complete portable pumping unit with motor and tank.

For further information address American Engineer, reference No. 493.

TECHNIQUE OF JOB ANALYSIS AND EVALUATION

A complete working manual on the Technique of Job Analysis and Evaluation in the clerical, technical and administrative fields has been issued by this company. The manual consists of 135 pages of text. It is a complete, practical working manual of salary job evaluation. The manual explains in detail the procedure used and is designed to enable interested companies to install the program with their own people without the aid of outside assistance. Copies may be obtained without cost by management executives requesting it on company stationery.

For further information address American Engineer, reference No. 494.

MIDGET MECHANICAL DIFFERENTIAL

Weighing less than 5 ounces, a midget mechanical differential, made of steel and bronze with precision cut gears and burnished bearings, is announced. The manufacturer states that a spur gear construction is employed to provide maximum strength and accuracy. Designed to provide simple, compact, accurate methods of mechanical power transfer, the differential is especially adapted for use in clutches, for power transfer and automatic sequence operations, measuring speed differences and sums, and measuring angular displacement between rotating shafts. Providing means for reliable mechanical and electrical follow-up controls, furnishing reliable methods for obtaining great percentage speed changes on the input shafts, and enabling reversal of output shafts without shifting gears or requiring reversing input shaft rotation and disconnecting of power, and other applications listed by the manufacturer.

For further information address American Engineer, reference No. 495.

HARDEX ELECTRODES

A new technical bulletin covering hard surface and the use of Hardex Electrodes in building up surfaces for resistance to shock and abrasion is offered by this company. The bulletin contains 16 pages of helpful information concerning such factors as effect of temperature and cooling rates on deposited metal, selection of the proper grade of rod, and recommended welding techniques.

For further information address American Engineer, reference No. 496.

NEW BUILT-IN COUPLING

A simple, fool-proof coupling which makes possible a "10 second" joining and disconnecting of individual sections of flexible tubing has been developed for Spiratube, a non-collapsible, retractible tubing. The new coupling is built into the tubing, eliminating the need of fittings. The manufacturer states that the coupling, a flat spring steel collar, may be compressed to slip inside the end of another section and then released to form a strong, tight joint. The sections are easily disconnected by compressing the inner spring steel collar and withdrawing the male end. The couplings, like the rest of the tubing, are covered with long-fibre duck fabric, which has been processed fire-resistant and coated with a tough, durable thermoplastic. There is no exposed metal inside or out, which makes Spiratube safe in the presence of explosive or inflammable materials. It eliminates sparking hazards.

For further information address American Engineer, reference No. 497.

GUIDE TO ELECTRONICS

To show how electronics is already speeding production, saving time and materials, and promoting safety in industrial plants, and to suggest how owners of other factories can put electronics to work, this comapny has published a new booklet, "The Business Man's Guide to Electronics." The booklet explains the six fundamental functions of electronic tubes, rectifying, amplifying, generating, controlling, counting and sorting, and inspecting, and describes the tubes required for each function.

For further information address American Engineer, reference No. 498.